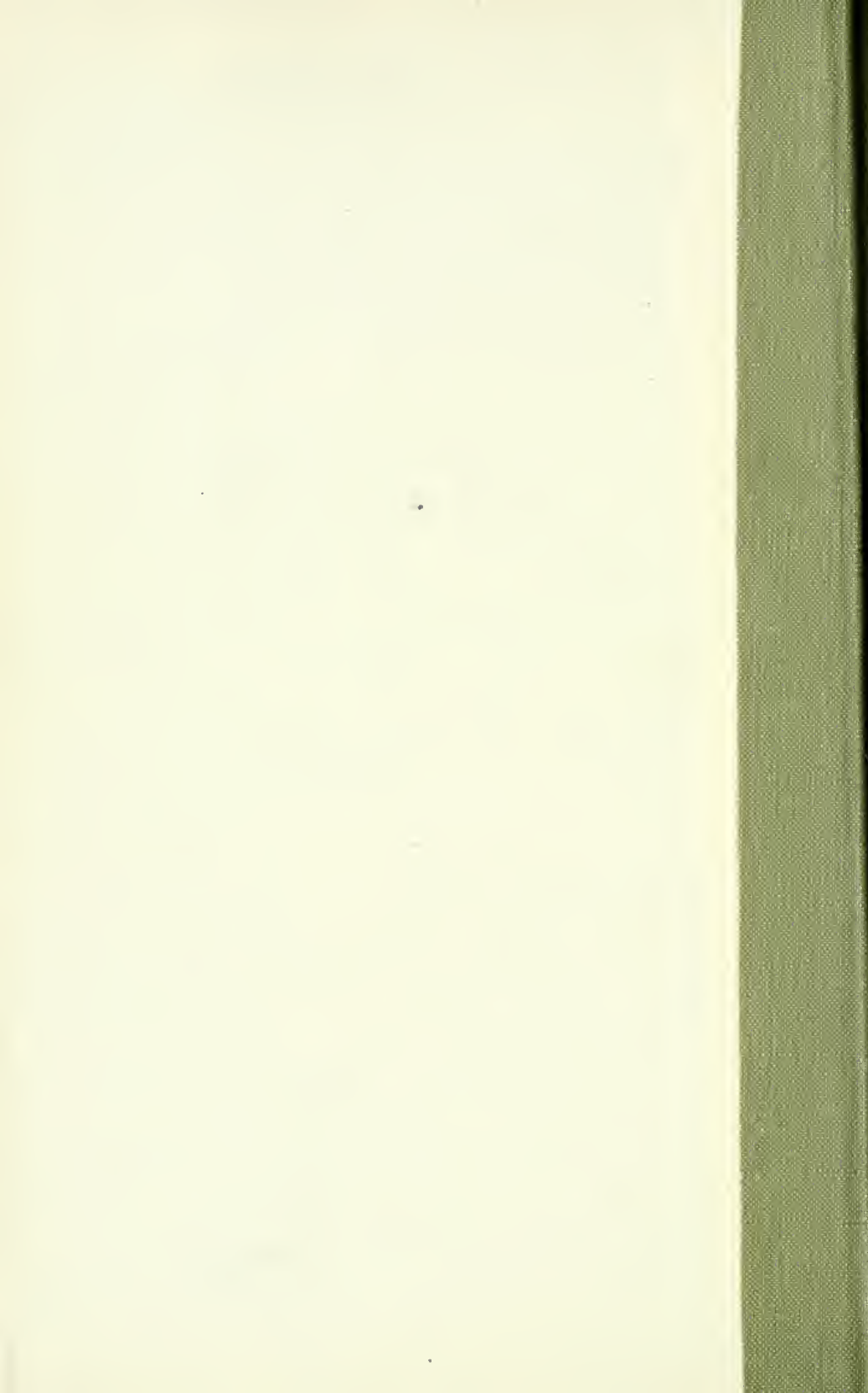


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THE ANNALS OF OPHTHALMOLOGY

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I.

THE PATHOLOGY OF THE CORNEAL SECTION AND ITS COMPLICATIONS IN CATARACT EXTRACTION.*

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Reviewing the recent advances in general surgery, as well as the operative treatment of the organs of special sense, the modern procedure of the removal of the senile cataractous lens holds a premier position. In delicacy and refinement of operative skill, as well as in the manifestation of subjective results, it is unsurpassed by operations performed upon any other human tissue or organ. That the results of cataract extraction are to be regarded as some of the most brilliant in the annals of surgical achievement is a fact not to be gainsaid. On the other hand, it cannot be denied that in a proportion of cases, fortunately comparatively small, some trifle occurring at the time of operation or shortly afterward may convert what at first promised a brilliant result into an irremediable calamity. With the object of investigating the healing pro-

*Read before the American Ophthalmological Society at Hot Springs, Va., May 13, 1914.

cess of peripheral wounds of the cornea the author has secured a collection of pathologic material postmortem, as well as eyes which have been enucleated on account of the more serious complications following the extraction of the senile cataractous lens. Other features of possible interest have been brought out by experimental work on animals, illustrating the process of healing of the cornea when incised, and the effort made at repair in some of the more common complications.

The cataract operation as now performed consists in the simple extraction of the lens without an iridectomy, the cortex and nucleus being delivered through the incised capsule. The combined method, of performing an iridectomy, would appear to be the operation of choice of the more conservative operators of the present day, avoiding as it does to a greater degree a prolapse of iris with its attendant dangers. Chandler, Stock and Elschmig excise a section of the root of the iris, a procedure which at once avoids such dangers and still has the advantage of retaining a rounded pupil. The method of shelling out the lens complete within its capsule is a procedure which, although not primarily introduced by him, has certainly been brought into prominence by Colonel Smith of the Indian Medical Service.

The healing of the peripheral corneal wound in any of these methods is comparable to that of a simple uncomplicated incision occurring at the limbus corneæ. Valuable contributions regarding some of the features of wounds of this character are mentioned by Parsons and Greeff in their treatises on ophthalmic pathology, to which the reader is referred for some of their details.

In early perforating wounds of the cornea, with the consequent escape of the aqueous, containing as it does albuminous elements, changes occur in the blood plasma or lymph with which it is brought in contact. Coagulation of these fluids occur which results in the production of innumerable excessively delicate fibrils known as fibrin, and which by their network arrangement serve to entangle lymph corpuscles as well as erythrocytes, inducing or actually producing what is physiologically understood as clot. Such a fibrinous exudate in the cornea may be regarded not only as serving to breach the incision, but further to furnish the initial elements neces-

sary to the preliminary effort at repair. The first manifestation of healing under such a condition would seem to take place through the middle or posterior fibers of the substantia propria, which are first brought into contact with the escaping aqueous. It is obvious that in oblique sections of the cornea, as in cataract incisions, cohesion and subsequent healing are definitely facilitated. Clark considers that this cohesion is sufficient to allow the aqueous to resecret in ten minutes in certain cases under favorable conditions. It is equally well known from clinical experience that where such secretion of the aqueous, or, in other words, where the reformation of the anterior chamber is inhibited, the circulation of the cornea is liable to suffer.

With the apposition of the central fibers of the substantia propria there occurs a triangular gaping of the superficial portion of the section as well as of that part directed toward the anterior chamber. The anterior chamber of the wound is covered very rapidly by an overgrowth as well as by a down-growth of the corneal epithelium (Fig. 1). Regarding the ingress of epithelial cells into the wound, Ranvier considered that their presence is first of all purely mechanical. These he considers to be normally in a state of tension, which, being released, a movement takes place in the direction of least resistance. Neese endorses this statement by the observation that mitotic figures are not present in the corneal cells about the depression at this stage of the injury; they would appear to occur later and only sparsely. This may be accounted for to some extent by direct cell division which takes place rapidly in the epithelium. This process possibly increases the tension of the cells where it occurs, and inclines to push the older cells into the wound. In about twenty-four hours mitosis may be observed in the epithelium filling the wound.

Leo Loeb has demonstrated in connection with the skin and other many layered epithelial structures that, within a few hours at the edge of the wound and before any mitotic multiplication is visible, the cells show definite ameboid and progressive motion, actually creeping over one another, so that in this way without multiplication a one or two layered epithelium encroaches over the edge of the wound. It is noteworthy that Peters, following the same idea, has described amebic movement in the cells lining a corneal incision,

but his statement lacks the substantiation of other investigators. The apex of the triangular space directed forward, and to which I have already referred, may frequently extend more than half way through the corneal parenchyma, the ingrowth of epithelium persisting for twenty-four hours, to be followed by a process of actual union.

According to Weinstein, mitosis may occur as early as one hour after operation, always in the more cuboid or cylindrical of the epithelial cells and generally at some considerable distance from the wound. In the course of a couple of hours mitosis may become more general, yet not necessarily at the lips of the incision. In four hours mitotic cells are noted in the anterior triangle as well as along each lip of the incision. At this period the process of mitosis is at its height. It is the opinion of Nüssbaum as well as of Marchand that direct cell division has not been observed.

A comparative function, though somewhat more retarded, takes place in the smaller posterior triangle directed toward the anterior chamber, where an ingrowth of endothelium may be observed. The inherent elasticity of Descemet's membrane after puncture results in its assuming a curled or spiral form and in its edges being drawn asunder. This separation of the severed ends permits an ingrowth of endothelial cells into the wound with their subsequent proliferation. This involution of endothelium, in my opinion, rather retards the healing of the wound, preventing as it does the direct apposition of the cut ends of the corneal parenchyma at this point, there being no actual scar tissue laid down here, as in the anterior triangle, on account of the absence of vascular elements (Fig. 2). I have noted sections where these endothelial cells not only cover the cut ends of Descemet's membrane and line the lips of the inner triangular space, but may be seen in considerable numbers burrowing over the cut hyaloid tissue and proliferating in considerable quantity between it and the innermost layers of the substantia propria (Fig. 3).

Weinstein has found amorphous cell masses on the convex surface of Descemet's membrane two days following a corneal section, and though no nuclei are seen in them they stain definitely with hematoxylin. Such aggregations are suggestive of an overgrowth of endothelium to which I have just referred. On the third day spindle cells are to be noticed

along the posterior surface of the wound. These cells proliferate to form a band which tends to unite the cut ends of Descemet's membrane, according to Weinstein's opinion. The same author has observed shorter and larger cells with well-formed nuclei, frequently showing mitotic figures, which lie upon the spindle cells projecting into the anterior chamber.

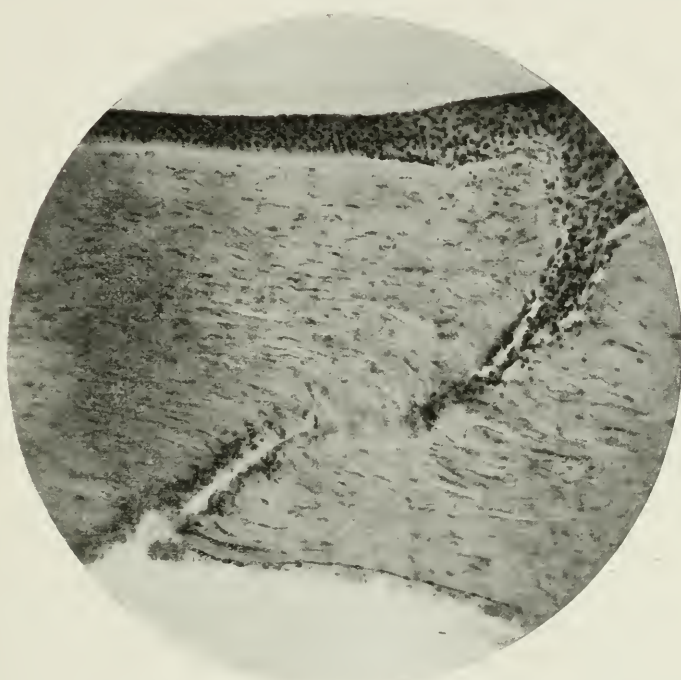


Fig. 1.—Corneal section seven days after cataract extraction. Puckering of corneal epithelium, with ingress of epithelium into anterior triangular space formed by wound. Direct healing of central corneal lamellæ. Ingress of endothelial cells into posterior triangular space with non-union of Descemet's membrane.

As previously suggested, all these cells are probably of endothelial origin. A combined action takes place in regard to the epithelial cells; a provisional or temporary covering of the incision by the old cells is followed by healing, the result of karyokinesis.

Regarding the healing of the cut ends of Descemet's mem-

brane, I hold with Parsons that they never unite. By this statement I do not maintain that a regeneration of a similar tissue may not take place possibly from the endothelial cells, possibly from the innermost layer of the corneal parenchyma, which in time may fuse with Descemet's membrane. Gepner and Wagenmann offer as their opinion that a new cuticular membrane may result from the activity of the endothelial cells, which they consider may become as thick as the parent membrane and in the course of years become part of it. It is stated as possible that Descemet's membrane may split into several layers. Becker records a case in which the cut ends were united after six years. The trend of Weinstein's arguments is interesting, if problematical, when he considers Descemet's membrane as differentiated corneal lamellæ which have undergone hyalin changes under the influence of the aqueous. The argument may be put aside in healthy corneal tissue when we are aware of the fact that normal endothelium is impermeable to the aqueous. Although not in a position to observe a case of such long standing as that recorded by Becker, the following series of cases existing over a varying period of time support my contention that primary union of the cut ends does not and further cannot possibly occur. I have been able to demonstrate the truth of this assertion experimentally upon the cornea of the rabbit, and have shown it to be true at various periods of time in man, as the following cases attest:

Case 1.—Rabbit's cornea incised and iris drawn slightly forward into the wound. The ends of the conjunctival flap were sutured and the lids fastened together. There was no postoperative inflammatory reaction, and the eye was enucleated after forty-eight hours. Sections show the earlier stages of regeneration of the corneal epithelium bridging over the space between the lips of the corneal incision occupied by the included iris. Some of these cells have a tendency to become involuted, adhering to the edges of the cut corneal fibers and existing between them and the apposed iris tissue. In the innermost or deeper portion of the section one may also note a comparatively similar behavior on the part of the endothelial cells which extend from the anterior chamber into the wound. Between these two types of cells one notices a large segment of Descemet's membrane which, as well as the

included iris, has prevented union of the severed ends of the cornea from taking place. There is also a distinct vascularization of this space, evinced by numerous red blood cells and leukocytes: provided, no doubt, primarily from the cut ends of the capillaries of the anterior conjunctival vessels, and possibly to a lesser degree from the vessels of the included iris in

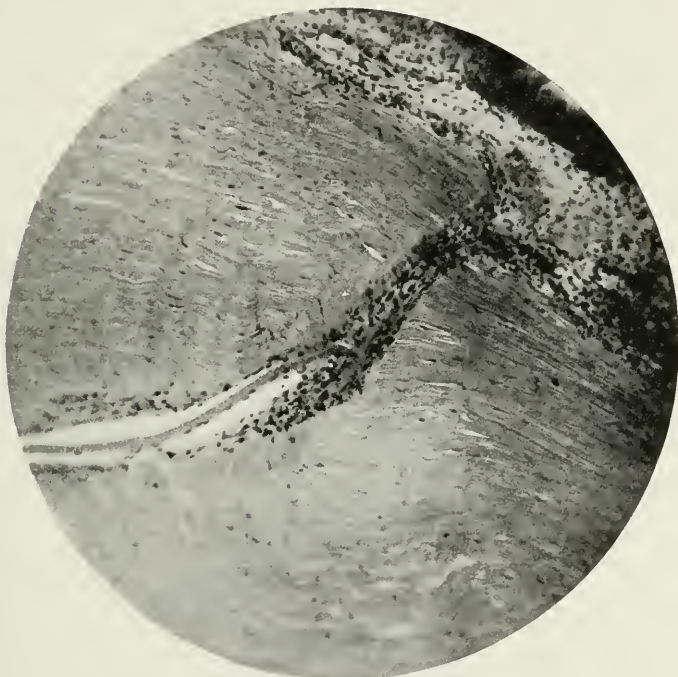


Fig. 2.—Section of cornea twelve days following operation. A very much weakened globe resulting from ingress of subconjunctival tissue cells into upper third of wound. The rest of the incision occupied by an involuted fragment of Descemet's membrane. Lower part of incision lined with endothelial cells. Absolutely no fibrous union in cornea. Distinct advantage of conjunctival flap in this case.

its effort at repair. The presence of endothelium which occupies so prominent a part in the healing in this section has been brought about by a presentation of those occupying the anterior surface of the iris or by those lining the included portion of Descemet's membrane. Histologically, they belong

to the same series of cells as those lining the anterior chamber. The segment of Descemet's membrane is consequently a permanent inclusion and, covered by endothelial and epithelial cells, constitutes an integral part of the modified granulation tissue.

Case 2.—A male, aged sixty-five years, who was operated on for the relief of senile cataract. A combined extraction was performed. The operation was not attended by any difficulty, and the eye showed no subsequent manifestation of complicating conditions. During the course of a successful recovery an attack of pneumonia set in which proved fatal on the twelfth day after the cataract operation. The eye was enucleated and embedded in celloidin. Microscopic sections show a decidedly weakened globe due to two causes: First, there is absolute absence of healing by fibrous union, this being entirely supplanted by an ingrowth of subepithelial elements. Second, the cut ends of Descemet's membrane are seen to be widely separated and contorted, very much as one would expect to find an analogous tissue as the lens capsule after the cortex has been extracted. One end of this severed membrane is seen rather shrunken, lying free from the rest of the cornea in the anterior chamber, while the other end of the segment occupies at least two-thirds of the space of the incised corneal parenchyma. An involution of endothelium, or at least a suggestion of a proliferation of these cells, seems to follow the course of the included portion of Descemet's membrane and to line the lips of the incision (Fig. 2).

Case 3.—The eye was removed postmortem one month after operation. This case has already been brought to the attention of this society by Doctor Byers,* by whose kind permission I am able to bring the case again before your notice in one particular aspect. Microscopic sections from this case show a perfectly quiet eye, with the process of healing well advanced. There is a distinct downgrowth of subconjunctival connective tissue elements and blood vessels into the wound which form a granulation tissue tending to establish a scar. This is completely covered by a well-formed conjunctival flap. A gaping triangle exists below, the innermost fibers of the cornea being drawn apart, while dense fibrous cells unite the central corneal lamellæ. At one

*Transactions American Ophthalmological Society, 1912, p. 81.

or two points there is a disposition towards an inclusion of the iris into the wound, while the cut ends of Descemet's membrane, like the corneal lamellæ in apposition to it, are distinctly drawn away from one another. There is no union or indication of regeneration in Descemet's membrane in this case, the cut ends being clearly and sharply defined. One is



Fig. 3.—Corneal section one month after operation. Well developed healing of central corneal lamellæ. Ingress of lens capsule into posterior triangle which has prevented healing. Healing also retarded by ingress of endothelial cells. Burrowing of endothelium between Descemet's membrane and innermost fibres of corneal stroma. Fragmentation of Descemet's membrane and innermost fibres of corneal stroma. Fragmentation of Descemet's membrane.

able to note in some of the sections a distinct proliferation of endothelium which occasionally tends to form tiny whorls at the edge of the incision. At other points these cells sometimes burrow between Descemet's membrane and the adjacent layer of the substantia propria. One is able to notice occa-

sionally an involution of the inclusion of shreds of lens capsule which, as in the two cases previously referred to, occupies the rôle of a nonabsorbable foreign body, inhibiting the process of repair of the innermost corneal fibers (Fig. 3).

Case 4.—A male, aged fifty-two. The attending surgeon, whom he had consulted for the relief of rapidly failing sight, had neglected to register the patient's light projection. Following the operation the eye became absolutely blind and for two years the patient suffered from periodic attacks of pain. The eye was finally enucleated for the relief of pain, the organ showing marked superficial and deep injection, ulceration of the cornea with an absolute tension; perception of light was absent.

Microscopic sections of the eyeball in this case revealed the presence of an enormous melanotic sarcoma occupying practically half of the vitreous cavity. There was a complete separation of the retina which, in my opinion, was partly in progress before the attempt was made to remove the cataract. There is evidence of a vertical incision through the corneal parenchyma rather farther forward than is usually the case. There has not been the slightest effort at the inclusion of conjunctival elements in the form of a flap. Union of the incision has been purely fibrous, there being no signs of granulation tissue at this late stage, it having been replaced much earlier by actual scar tissue. There is also no indication of an included membrane within the scar. Following the operation for the removal of cataract there has doubtless been a most active iridocyclitis. This is evinced by the very dense connective tissue membrane of a postinflammatory character extending from the ciliary body of one side to the other and which is also drawn forward into the wound. One is still able to differentiate the cut ends of Descemet's membrane, separated from one another and lying free on each side of the newly formed postinflammatory tissue, where it meets the corneal section at its innermost point.

Other specimens from my work done on rabbits show not only an involution of Descemet's membrane into the wound of the cornea, with its consequent nonunion, but I have been also able to demonstrate an actual fragmentation of this membrane (Fig. 3). One specimen shows particularly well after the second day, a comparatively large segment broken free

from the parent membrane and existing as a distinct loop on the anterior surface of the iris as it lies adjacent to the corneal incision in a condition of prolapse.

There is consequently, in my opinion, from the postoperative cases which I have cited as well as from the observations which I have been able to carry out in animals, no doubt regarding the nonunion of the cut ends of Descemet's mem-

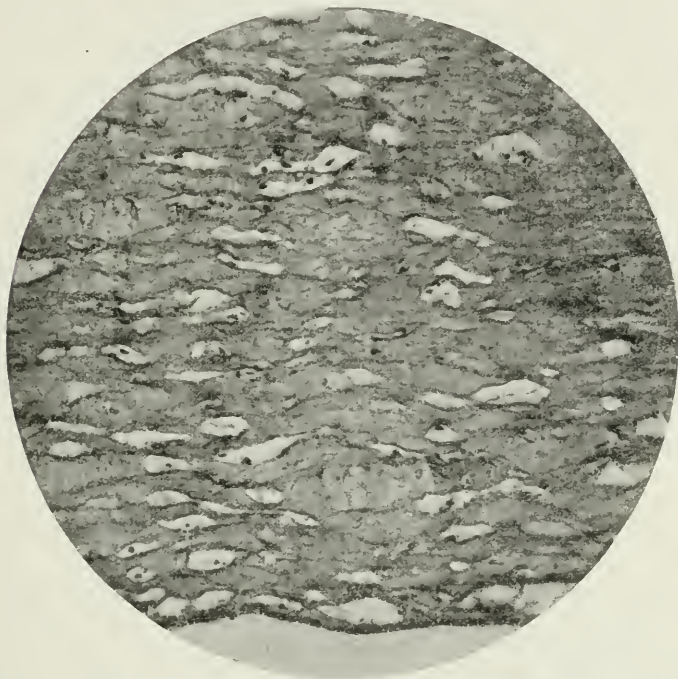


Fig. 4.—Edema of cornea following section as an early manifestation of infection. Swelling and distortion of corneal interspaces, many of which are filled by lymph exudate. Exfoliation of endothelial cells lining Descemet's membrane.

brane. As I have already explained, I am not maintaining that a regeneration of a similar membrane may not occur histologically identical with that of Descemet's membrane; I am not in a position to make any authoritative statement in this regard. My contention is that in sections of the cornea a direct reunion of the cut ends of Descemet's membrane does

not occur, and this for several reasons. From the inherent elasticity of a completely incised membrane, as in the case of the perforated lens capsule, the cut ends are widely drawn apart. From the disposition of such an incised membrane to twist or twirl when not supported below, or even in certain cases, as I have shown, to actually break off. And lastly from the disposition of the lining endothelium to cover over the cut ends of the membrane, inducing what might almost be considered as an inhibition to union due in certain cases to a modified form of granulation tissue minus the vascular elements—a rather unfortunate term which I am forced to adopt in such a process for want of a better one. These endothelial cells cover the cut ends of the membrane and prevent them from uniting even though these ends are not approximated.

THE PATHOLOGY OF THE CONJUNCTIVAL FLAP IN CATARACT EXTRACTION.

A short reference to the pathology of the conjunctival flap as applied to the corneal section in cataract extraction will serve to demonstrate its surgical significance and the rôle it plays in assisting corneal repair. In the first place it acts as a mechanical covering for the wound, preventing the access of air as well as of the conjunctival exudate, which is seldom free from some mild form of microbic growth. It also prevents the lips of the wound from separating and the breaking down of the incision is less likely to occur. With a section through the subconjunctival tissue a number of the minute terminal capillaries from the branches of the anterior conjunctival vessels are severed, from which an exudate of plasma is exuded and which, when fibrin is formed very shortly afterward, binds or seals the entrance of the wound completely at some remote distance from it. This action of the conjunctival flap would thus assist healing by preventing access of microorganisms through the assistance it affords in substituting direct fibrous union about the outermost corneal lamellæ as a substitute for granulation tissue. And lastly, by promoting an added determination of hemic elements in the form of leukocytes as well as of erythrocytes in order to inhibit infection as well as to promote repair (Fig. 2). Furthermore, it will be noted that, in sections of the cornea with a conjunctival flap, union of the substantia propria is aided

not so much by an ingress of superficial epithelium but rather by an ingress of the cells of the submucosa and those cells of the new connective tissue type. These connective tissue cells are frequently seen within the anterior triangle associated with new capillaries and blood vessels, extensions from the subepithelial elements of the conjunctiva (Figs. 1 and 2).

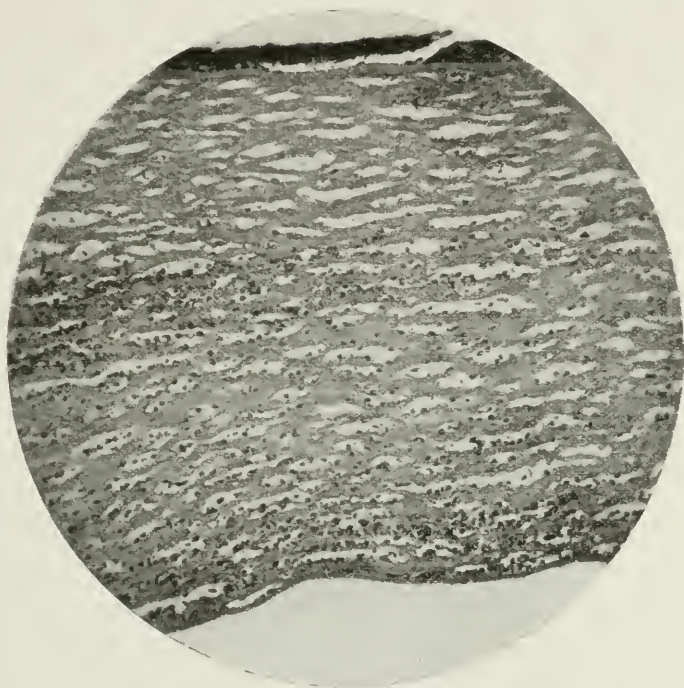


Fig. 5.—Septic wound of cornea four days after section. Infection due to *S. pyogenes aureus*. Distortion of corneal interspaces which are occupied by large and small mononuclear leukocytes. Comparatively smaller number of polymorphs, although these are noted to be much more numerous in anterior chamber. Exfoliation of endothelial cells lining Descemet's membrane.

I have been able to demonstrate all these features in the conjunctival flap of a rabbit at the end of two days, at which time organized union and newly formed connective tissue were established in the flap.

The question is naturally asked why in certain cases of trephining for glaucoma a late infection occurs. One of these

cases has recently been reported from Professor Dimmer's clinic by Bachstet. The bleb became infected and showed evidence of pus seven weeks following the operation. It was evacuated and staphylococcus albus was grown in culture. An excised particle of the conjunctiva from this neighborhood, after a recurrent attack, showed evidence of a subchronic form of inflammation, according to the author. Mononuclear leukocytes were present in large numbers, while polymorphonuclears were evident but to a less pronounced degree, and eosinophiles were also in evidence. New connective tissue cells could be determined by special staining. No actual bacteria could be demonstrated in the tissue by Gram staining. It is my opinion that the method of making the conjunctival flap down to its extreme corneal limitation is responsible for the infection. In dissecting the flap down to the limbus the subconjunctival connective tissue is reduced to a minimum thinness, when at the corneoscleral margin it may be regarded at times to consist of little more than the epithelial elements. It has been shown that the nidus of infection in the conjunctiva is not of necessity in the epithelial layers of cells, but often, as Morax has shown in the case of the Koch-Weeks bacillus, to be well beneath the epithelial cells in the subconjunctival tissue. No very great degree of imagination is necessary in order to appreciate how simple it would be for certain forms of bacteria to infect the anterior chamber when the supporting cells of the filtration bleb had been very much reduced in the preliminary dissection. Furthermore, the influence of the pressure of the escaping aqueous must of necessity exert a certain degree of pressure on the cells lining the cyst with which it comes in contact, an atrophy and consequent weakening, such as one would expect to find in any inflated body, the deeper cells of the conjunctiva being reduced through pressure from a cuboid to a more flattened or squamous type of cell (Fig. 7).

Wagenmann's work dealing with the dangers of a cystoid cicatrix is of interest. He stated that an eye may be affected with suppurative inflammation of the uveal tract months or years after the healing of a wound. He has recorded the results of microscopic examinations of eleven eyeballs affected in this way, and in each case micrococci were found in the interior of the eye. The suppurative process appeared in all

cases to have started from the cicatrix with which the vitreous was usually found in contact. This would rather support the opinion that the vitreous is a more effective culture medium than the aqueous. Wagenmann further regarded the condition as one of new infection through the cicatrix and not one due to micrococci having entered the wound before it was healed and then for a long time remaining inert. He also did



Fig. 6.—Rabbit. Peripheral incised wound of cornea after forty-eight hours. Prolapse of iris into wound, with surface of presenting iris covered by several layers of epithelial cells.

not consider it due to organisms brought to the wound by the circulation and there finding a congenial soil.

SEPTIC WOUNDS OF THE CORNEA.

Pyogenic inflammatory changes may occur in incised wounds of the cornea through the agency of the bacteria whose nidus is in the normal conjunctiva and from which,

through its rich vascular supply, disturbance in the conjunctiva is inhibited. The microorganism by far the most frequently met with in suppurative conditions of the incised cornea is the pneumococcus; other organisms of relative frequency are the staphylococcus pyogenes aureus, ozena bacillus, and the streptococcus. Microorganisms normally quiescent in the conjunctiva may acquire an added virulence through the stenosed duct, as Plaut and von Zelewski have shown. For example, the staphylococcus pyogenes albus, of itself often benign in action, may in a case of lacrimal stenosis set up a most virulent form of infection, such as is noted after the frequent transfer of this organism.

It is interesting to note Treacher Collins' figures and conclusions in regard to infected corneal incisions. From fifty cases taken in 1888 from the records of Moorfields Hospital, at a time when suppuration was a more common feature than at the present, he noted that infection in the large majority of cases was manifested on the first, second or third day following operation. In eight cases it did not appear until after the fifth day, while in one case not until after the thirteenth day.

Morton, in 1875, recorded 146 cases with eight suppurations (5.47 per cent). In 1883 there were 225 cases with fourteen suppurations (6.2 per cent). Marshall, in 1889 to 1893, reported 1519 cases with twenty-six suppurations (1.7 per cent). Treacher Collins, in 518 operations from 1900 to 1912, had six suppurations (1.15 per cent).

The lowered percentage is responsible, according to Collins, to greater precautions taken in surgical practice of the present day. Greater care is observed in eliminating all infective discharge from the lacrimal sac, conjunctiva, and the lid margins. Instruments are more perfectly sterilized, a precaution which was not adopted prior to 1883. The use of a local anesthetic has facilitated a more perfect toilet of the wound following operation. The substitution of a corneal section with a small conjunctival flap has been an improvement on the linear section of Graefe. Further assistance has been afforded by rendering the field of operation as aseptic as possible by the use of sterile dressings.

In the cornea there may be varying grades of infection. There may be one of very mild degree, as in conditions of

lagophthalmic ulceration, where slight exfoliation of the superficial cells is followed merely by swelling and overgrowth of the surrounding cells and replacement of new ones by anitosis, or budding. More definite injury is probably followed by an ingress of leukocytes and lymph from the



Fig. 7.—Cystoid scar at corneo-scleral margin. Buttonhole opening in iris. Prolapse of anterior ciliary process. Cyst lined with uveal pigment and filled with vitreous. Condition suggestive of complicated Elliot's trephine operation.

interstitial spaces of the substantia propria, as well as from the tears which first fill the wound (Fig. 4). As the corneal corpuscles multiply they pass away, bearing with them the necrotic detritus of the inflammatory process and restoring normal tissue.

In more definitely suppurative conditions there is present a period of bacterial growth with swelling, degeneration, and subsequent cell necrosis at the point of infection. There may be bacterial extension into the surrounding tissue spaces and about the more peripheral corpuscles, which become more swollen and their process more prominent. Only after several hours may evidence be elicited of the bacterial toxins having invaded the corneal lymph interspaces (Fig. 5). Following the engorgement of the pericorneal veins there is a margination of leukocytes with a consequent migration of these toward the site of the injury. As Adami has pointed out, the process is now comparable to abscess or ulcer formation.

Progressive tissue destruction, with even more marked accumulation of leukocytes, is prevented in those cases which end in healing where the blood vessels become actually involved. This pathologic truism is endorsed in the various clinical methods of maintaining or substituting conjunctival flaps in operative procedures upon the eye, or after accidental perforation through conjunctival tissue. Adami further suggests the formation of buds or processes which later form new vessels; these he considers due to chemiotactic influence. From the marginal vein several such processes may be given off at many points and directed toward the ulcer or point of infection. If the suppurative focus be not central these are generally more apparent on the side nearest the ulcer. As these processes enlarge they become canalized and form new vessels in a previously avascular membrane which pass to the region of the injury. When once formed, these vessels may be evident for years as an indication of earlier corneal inflammatory change. When the process has not been duly arrested, the result of unequal battles between toxins and the lymphocytes, the whole thickness of the cornea becomes necrotic or septic. One has also to note in this general inflammatory stage the partial or complete exfoliation of the endothelial cells lining Descemet's membrane (Figs. 4 and 5). These, no doubt, are cast off and constitute part of the detritus recognized as hypopyon. It is true that the aqueous humor may escape through the ulcer or septic wound, but on the other hand the whole eye as an organ may be involved in a generalized inflammatory process.

PRESENTATION OF THE IRIS.

Following a penetrating wound or an extensive ulceration of the cornea the margin or stump of the iris may be irresistibly drawn forward. This course of events is a natural one following the escape of the aqueous along its newly formed channel. Such iris prolapse may occur either at the pupillary margin or at any more distant point. The membrane knuckles into the wound, although its adjacent surface would appear to have itself escaped any injury. Should the iris remain for any length of time within the lips of the wound, a condition of anterior synechia is formed. This is constituted not so much from the presenting membrane, which in all probability forms what is technically known as leukoma adherens, but more from the resulting lymph exudate which forms between the iris and the adjacent corneal tissue. With recovery of the incision, atrophy of the included iris occurs, it being replaced by scar tissue elements.

Changes in and about Descemet's membrane, to which I have already referred in the healing process of uncomplicated corneal wounds, play some part in this condition. An exudate of long spindle cells, with rod-shaped nuclei, replace Descemet's membrane, and, although not directly adjacent to the site of perforation, these modified endothelial cells may fill the angle between the iris and Descemet's membrane. The endothelium covering the anterior surface of the iris is liable to form a hyalin cuticular membrane upon the iris surface as a result of the irritation induced by the synechiæ. In an old adhesion, consequently, Descemet's membrane may appear to pass on to the surface of the iris, or even to split at the edge of the adhesion, one part lining the true membrane, the other the newly formed one. With the partial prolapse of iris, a grayish or brownish prominence may appear upon the corneal surface, and the anterior surface of the iris becomes fused with the edges of the wound, as in the case of the anterior synechia. Any part of the protruding iris which presents above the surface of the cornea becomes covered with lymph exudate over which the epithelial cells rapidly proliferate. After inducing prolapse of iris in rabbits, I have, after the space of two days' time, been able to show the whole presenting membrane to be covered with epithelial cells (Fig. 6).

These epithelial cells are reformed, not as a single layer, as one might expect, but as several layers of cells, very much as one would observe in the epithelium covering the cornea. They completely bridge over the aperture occupied by the presenting iris, and extend from one lip to the other of the corneal incision. The underlying cells between them and the iris tissue proper is replaced by granulation tissue.

The contraction of the newly formed connective tissue elements has the tendency of flattening this knuckle or projection, and a firm gray scar generally results. In a certain proportion of cases this scar formation may not be sufficiently dense as to withstand the force of the intraocular pressure. The granulation tissue gives way and allows the presenting aqueous an exit, in this way constituting a cystoid cicatrix of epithelial or endothelial scar tissue and the pigment cells of the iris (Fig. 7). The bleb or scar, in such instances, may frequently appear black. Should the iris only fill the posterior portion of the wound the anterior part may heal in the ordinary way by primary union of the apposed stroma cells of the substantia propria, their union with the iris being looser than with the corneal parenchyma. Here, too, cystoid formations may occur; these, however, are not anterior to the iris but have the retinal pigment upon their posterior surface, differing from the cystoid cicatrix which is an outlying projection of the anterior chamber and covered anteriorly with uveal pigment.

In the more complete forms of iris prolapse a disintegration of the pigment of the iris occurs, the exfoliated pigment granules being taken up by the leukocytes floating free in the lymph spaces of the iris stroma. Masses of pigment cells may become permanently included in scar tissue and remain embedded for years in an unaltered condition.

One danger coincident with the prolapse of iris tissue into an incised corneal wound is the constant or transitory irritation exerted upon the ciliary body. Such stimulation or irritation of a traumatic nature may naturally be held responsible for the induction of sympathetic ophthalmia. Moreover, some authors would attribute a possible bacterial ingress to a prolapse of iris. In a former communication, however, I have shown that a highly vascular membrane, such as the iris, tends to block the wound by damming the breach with its own

tissue, as well as with the lymph exudate which it throws out. By its rich vascular composition the iris is further able to carry off through its own channels of circulation invading microorganisms which might have a definite purulent effect on the incised latent and avascular cells of the substantia propria. That such an action on the part of the iris is of a suicidal nature in provoking or in actually inciting sympathetic irritation is a fact which I cannot deny. The action of this membrane, however, is in my opinion quite comparable to that of the omentum in abscess formation following perforation of a diseased appendix; a generalized septic infection would be courted were the vascular omentum not interested in the process of repair.

INCLUSION OF LENS FIBERS AND CAPSULE.

The inclusion of a quantity of lens matter as well as the presentation of the vitreous humor plays a definite rôle in the delay of primary union of the incised cornea. It is true that the cortical fibers may be included in the wound, either in clumps or as isolated cells. These in the course of time are either cast off or absorbed, and ultimately granulation tissue, and later true scar tissue, follow. The period of delay necessitated by such an inclusion of foreign matter is one fraught with danger owing to the possibilities of microbic ingress. The sources of contamination in such cases are the conjunctival sac and the lacrimal passages. With regard to the lens capsule the danger may be even a more positive one. Its curled and irregular inclusion may occupy an uneven position in the incision and produce evident irritative reaction. This reaction is manifested by the lymphocytic infiltration which may proceed to the deeper tissues of the eye, effecting a cyclitis. Such a form of inflammation, according to certain authorities, may be one absolutely due to irritation and not of necessity responsible to bacterial ingress, polymorphonuclears being comparatively diminished. Two of my sections, however, with an included membrane show a perfectly undisturbed reparative process, in one case two weeks after operation and in the second after one month. Each case had the advantage of a conjunctival flap (Figs. 2 and 3). If reaction is present it, in all likelihood, is responsible to the extreme resistance of the capsule to the process of absorption, whereby

healing of the wound is delayed, and with such an inhibition satisfactory consolidation is indefinitely retarded, if not actually prevented. A more acute inflammatory reaction may be naturally induced, infection proceeding along the course of the included capsule, when a condition of generalized intra-ocular infection results.

Collins, in discussing the question of included lens capsule, says that in his experience pathologic manifestations of inflammation are frequently limited to the parts bounding the anterior and posterior chambers, the choroid, retina and vitreous being involved. He has found in some of these cases imperfect closure posteriorly of the lips of the corneal incision due to a presentation of the lens capsule. The ununited margins of the wound on each side of the entangled capsule were occasionally infiltrated with inflammatory cellular exudate, and in some sections he thought he could trace direct continuity between inflammatory exudate in the conjunctiva overlying the wound, along the sides of the wound, to a similar condition in the interior of the eye.

He was at one time inclined to think, from the appearance of these sections, that the piece of entangled capsule acted as a foreign substance and incited inflammation in the wound around it. His present interpretation of conditions is that the entangled lens capsule does not incite inflammation but, by impeding the union of the lips of the wound, favors the spread of inflammation through the imperfect cicatrix from the conjunctiva into the interior of the eye.

In the case of the presentation and subsequent escape of the vitreous this may appear as separate particles or droplets, or it may be presented as an integral part of the whole vitreous body. Nonunion in these cases is attributed to two causes. In the first place the membrana vitrea, in being included within the lips of the corneal incision, may play very much the same rôle as the included lens capsule or Descemet's membrane. Naturally, this membrane is very much less dense than the two just referred to, and its inhibition may only be one of degree and would perhaps be in a measure comparable to the action of the endothelium lining the anterior chamber. The second reason for the possible cause of nonunion is the different specific gravity of the vitreous and the other fluids as the aqueous, blood, and lymph which take part in

the healing process. The vitreous, when presented, if not actually expelled through the wound, is retained within the lips very much as a foreign body on account of its more tardy resorption.

A point which I have been able to bring out in my recent comparative investigations is the assistance rendered by lymph and serum when associated with the presentation of the vitreous. From the blood which is expelled into the anterior chamber from the excised iris, or possibly from the corpuscles which have found their way in through the wound from the incised conjunctival capillaries, a fibrinous exudate is produced. These features are brought out particularly well in Mallory's phosphotungstic acid hemotoxylin, as well as in van Gieson's stains, although ordinary sections of hemotoxylin and eosin bring out these features quite distinctly. These fine delicate strands of newly formed fibrin are clearly shown in some of my sections to extend from the blood corpuscles with which they are evolved to the presenting vitreous, and from it to the anterior lens capsule or to the surface of the cornea or presenting iris to which the vitreous is approximated. This fibrinous exudate with the secondary influence and assistance of granulation tissue formation from the more superficial conjunctival elements does much in promoting the process of healing in such cases of presentation of vitreous.

PRESENTATION OF THE CILIARY BODY.

In occasional instances when dealing with a small hypermetropic eye, and a correspondingly large lens which contains a larger nucleus than usual, a peripheral corneal incision may be selected by the operator which encroaches into the region of the ciliary body. Such an incision really involves scleral rather than true corneal tissue. In such instances it is possible for the prolapsed anterior ciliary processes to become included or entangled within the posterior part of the lips of the incision. Such an inclusion produces not only a delay in the process of healing, but actually incites very definite sympathetic dangers. Operated eyes with such a complication demand drastic treatment from the very first evidence of warning, and an enucleation is generally necessitated before an actual manifestation of the process of healing is brought about, such a manifestation being one of an acute inflammatory disturbance.

There are cases of cataract extraction where the edges of the incised wound are not brought into actual or direct apposition, or where overriding occurs. In such cases the ingrowth of the corneal epithelium may be distinctly more extensive, covering both edges of the wound and proceeding into the anterior chamber. This ingrowth of corneal epithelium may even cover the lining of the anterior chamber and the anterior surface of the iris, or may possibly line the whole of the anterior chamber. Such a process is practically a substitution of an epithelial overgrowth upon the endothelial cells in this neighborhood. The process is a rapid one. Meller states that the ingrown or implanted epithelium finds its way between the retracted ends of Descemet's membrane and the substantia propria, but that it also proliferates on its posterior or endothelial surface as well. When present these implanted cells are found to occur in strata, the innermost being cylindrical, the outermost of the squamous type. The same description applies when these cells are found covering the iris. They are often difficult to distinguish from endothelial cells normally occupying the anterior chamber lining Descemet's membrane and covering the iris.

These wounds occasionally heal in places, while delay or nonunion occurs at other points occupied by implanted cells. In such instances, frequently, the evidence of repair seems quite tortuous so as to give one the appearance of a solid downgrowth of tubes or of large cystic spaces. Such incised edges, when lined with epithelium, cannot readily unite until scarification of the tract is brought about. The fistulous course which ultimately persists is then so tortuous that the aqueous is unable to escape. The walls are brought together by intraocular pressure and induce a form of secondary glaucoma, the scar, however, acting in certain favorable cases like a filtering or cystoid cicatrix.

KERATITIS STRIATA.

— It is held that in certain forms of cataract extraction, when an unusually large lens has been strangulated within the lips of the wound and some difficulty experienced in its delivery, a condition termed keratitis striata occurs. This is manifested as fine grayish parallel streaks in the cornea. These striations run, as a rule, in a vertical direction, while the cor-

neal tissue between them seems to be less disturbed. These lines or streaks may, at times, be more or less branched. It has been observed that the point of intersection of such lines frequently results in the formation of tiny nodular opacities. Holmes Spicer describes these striations as bars or tubes which appear to be quite solid, or granular, reaching a measurement of 5 mm. In place of their being regarded as solid, they occasionally seem to have a double contour consisting of two lines with a comparatively clear space between each, distinctly suggestive of a tubular formation.

This condition in the cornea appears, as a rule, about twenty-four hours after operation, and would seem to have no derogatory influence upon the process of healing. It disappears generally between ten and twelve days. Becker and von Recklinghausen have noticed an extension or expansion of the lymph spaces of the cornea as a possible cause for such a condition. The one point against this view is, as Lacquer has pointed out, the perfectly straight direction of the corneal opacities or striations. Newell considers the condition as being due to folds or pleats in Descemet's membrane, the endothelial cells, by such a process, being exfoliated from these pleats and the unprotected cornea rendered turbid from the influence of the aqueous. From a case examined postmortem he describes the cornea as creased or folded. On the summit of the fold there was noted an exfoliation of endothelium and a condition of noninflammatory infiltration of the adjacent corneal cells. This he attributes to the pressure exercised by the bandage. Hess disproves this thoroughly by finding keratitis striata in eyes that have not had the pressure of a bandage applied. From experimental observation Hess considers that a widening of the corneal spaces is not present, and that the lines are due merely to a folding of Descemet's membrane following its relaxation, the result of the corneal section.

From the views which I have already outlined, one is apt to consider this condition occurring after operation as one of a mild traumatic influence originating either from irritation or from strangulation of the endothelial cells lining Descemet's membrane. In conformity with these ideas I used to hold that, after irritation, these cells would become edematous and swollen and that they would subsequently be cast off in the same line of direction as the delivery of the lens cortex which

was formerly apposed to their surface. This view also appealed to me as a possible reason for the vertical direction of these striations. After the exfoliation of these cells it seemed reasonable to follow that the underlying Descemet's membrane would be exposed to the influence of the aqueous, and that this membrane at these various underlying points would become swollen and edematous. Assuming such to be the case, these foci of edema or infiltration would, in consequence, present clinically the convoluted or tortuous characteristics which other authors have already described. The thought has also occurred that a mild degree of leukocytic or lymphocytic infiltration might be present in the innermost corneal interspaces adjacent to the lines or convolutions of Descemet's membrane.

It has further occurred to me that alterations in the endothelium might be induced or brought about by the various forms of intraocular irrigators now in use. When a direct stream is applied within the anterior chamber at an ordinary elevation of the vessel containing the normal saline solution, the remains of the lens cortex as well as the fragments of the lens capsule are removed. Healing naturally proceeds without further complication, provided, of course, no undue difficulty has been met with either in the delivery of the lens or in the performance of the iridectomy as to cause irritative disturbance. Should the vessel be elevated perceptibly in such a manner as to raise the force of the flow of the saline solution within the anterior chamber, it seemed to me probable, if not possible, that irritation to the endothelial cells might easily result. Some of these cells might be irritated by the direct contact with the force of the stream; others might be forcibly removed by an increase in strength of the circulation brought about by the elevation of the irrigator.

Such interpretations have been dispelled by some of my recent investigations. For in several cases where I had incised the corneae of rabbits, and where distinct trauma or irritation to the endothelial cells was purposely applied at the time of operation, no clinical evidence of this disturbance could be noticed. This was true up to four days, when the eyes were enucleated for purposes of microscopic investigation. There was, it is true, clinically a slight generalized edema around the lips of the corneal incision which one could

note in any normal healing wound of the cornea, and more particularly in one in which any roughness has occurred. Examining the eyes microscopically, the sections showed, perhaps, a little additional infiltration about the lips of the wound. But in regard to the tissues which we have had under consideration, and in which we would naturally anticipate pathologic changes, little or nothing abnormal could be found. The internal surface of Descemet's membrane was not denuded of its endothelial cells, Descemet's membrane itself did not appear to be swollen or edematous, and there was no apparent infiltration of lymph in the spaces between it and the cells of the substantia propria.

Following up such observations, it appears to me that we must consider such possible alterations in tissue cells from another point of view, namely, from that of age, with the changes which it brings about. For it must be remembered that in cases where striped keratitis has been noted, it has appeared in those who have passed middle life. Such, at least, has been my experience. In such cases one must reasonably expect alterations in the endothelium, or in Descemet's membrane, or in both, of an atrophic or sclerotic nature. This alteration might permit access of the aqueous through these cells, possibly by a process of osmosis, when once tension has been released by a corneal section. Pathologically, the condition appeals to me as comparable in a measure to our interpretation of the action of the aqueous through the lens capsule, where it is held by some to be responsible for the production of senile or cortical cataract.

THE ACTION OF COCAIN AND OF BICHLORID OF MERCURY.

Certain recognized forms of blurring of the parenchyma as well as the exfoliation of the corneal epithelium have been observed taking place after the use of cocain. This is true when it is instilled in the stronger solutions or when directly applied in the solid crystal or powder form. Many authorities lay the onus of the blame to the combination of cocain with mercuric salts, producing the subsequent desiccation of the superficial corneal cells. Würdinger attributes the desquamation to the fact that the eye is left exposed during the local anesthesia. He asserts that if the lids are closed during this period, and sterile water instilled during anesthesia, such

desquamation is less likely to occur not only for cocain alone but also in the case of sublimate and other forms of antiseptic solutions.

Würdinger further asserts as his opinion that the parenchymatous form of inflammation, as described by Bunge, is present on opening the cornea after employing a solution of bichlorid of mercury 1:5000, but more intensely so after the prior use of cocain. Mallinger endorses this observation, but also is of the opinion that if the cornea be not opened, desquamation only occurs without alteration in the substantia propria. He further asserts that the sublimate finds its way into the anterior chamber and produces through its influence there an irritation upon the endothelial cells lining Descemet's membrane. This condition is one very similar to that which Leber was able to induce after scratching the membrane. On section, one further finds the infiltrated portion of the cornea considerably thicker than the clear substantia propria, due no doubt to stagnation or to other circulatory disturbances in the lymph channels. Greeff holds that the endothelial cells are lacking or destroyed in acute forms of inflammation and that these are restored within eight days. The clearing up of the cornea follows.

Certain forms retain the blurring in the parenchyma. Sections from these cases show that the endothelial cells have been regenerated, yet there is a wavelike alteration in the corneal cells and a serpiginous arrangement of the corneal corpuscles.

The substantia propria in these cases is in many ways rather more suggestive of scleral tissue. The cause of the disturbance would consequently appear to be the facility of ingress of sublimate through the corneal tissue by means of its deficient epithelial covering. After its secretion into the aqueous its irritating effect is produced upon the delicate endothelial cells lining Descemet's membrane.

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II.

CONTRACTION OF THE FRONTALIS IN ABDUCTION OF THE EYEBALL.*

WILLIAM ZENTMAYER, M. D.,

PHILADELPHIA.

Several different groups of cases have been reported in which muscles ordinarily not acting together, or not having the same nuclear origin of control, have been associated in action.

Such cases have been classified by Friedenwald as follows:

1. Contraction of the levator palpebræ superioris with the act of moving the jaw or swallowing.

2. Contraction of the orbicularis associated with movements of the jaw, or contraction of the various face muscles (after facial paralysis).

3. Contraction of the levator palpebræ superioris associated with abduction or adduction of the eye.

To these the writer would add:

4. Contraction of the frontalis associated with abduction of the eye.

The cases may be either congenital or acquired, and may or may not occur in connection with palsies or anomalous development or insertion of the ocular muscles.

Marcus Gunn was the first to call attention to the phenomena seen in the first group, to which the term "jaw winking" has been applied. In nearly all of these cases it has been found that lateral movements of the jaws were accompanied by elevation of the upper lid on one side, the other side remaining still. Similar lid winking has been observed in opening of the mouth and in swallowing.

The committee appointed by the Ophthalmological Society of the Royal Kingdom to report on Gunn's case gave it as

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its opinion that the phenomena were to be explained by innervation of the levator, both from the nucleus of the third nerve and the external pterygoid portion of the nucleus of the fifth nerve.

In Harlan's (G.) case the behavior of the lids was somewhat different. During mastication there was rapid winking

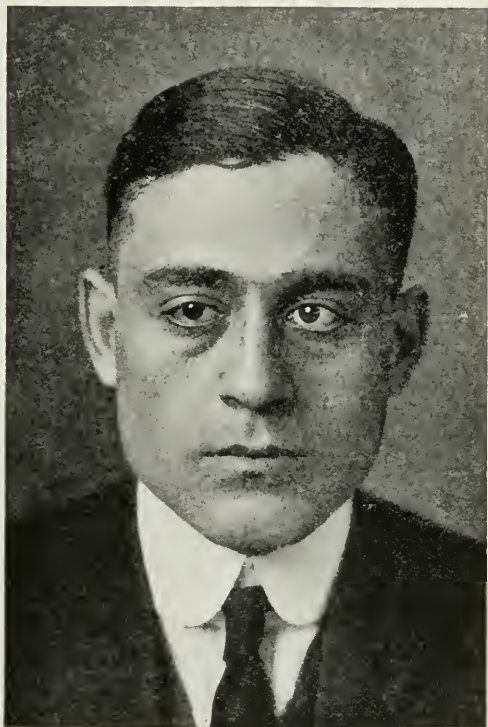


FIGURE 1.

Primary position, showing squint of twelve degrees.

of the left eye, which gave the impression of a blepharospasm. It was an acquired condition in a child four years of age, and followed an attack of typhoid fever.

Harman believes that these cases represent atavistic anomalies, as in the shark the fifth and the seventh nerves are so closely associated that they are called the "facial complex."

Harlan considered this a logical explanation and accepted it for the explanation of his case.

As illustrating the second group, Harman's observation that elevation of the alae of the nose accompanied normal blinking of the eyes in twenty per cent of persons examined, may be mentioned. Topolanski has made a similar observation. He has seen a large number of cases in which, when the orbicularis of the eyes was contracted, a simultaneous vertical fold appeared at the wing of the nose on the same side, the result of contraction of the levator alae nasi. His explanation of this is that the lateral portion of the malar muscle (*quadratus labii superioris*) reaches to the wing of the nose, and that the anatomic association between these two muscles occasions the simultaneous contraction of the lids and the wing of the nose.

The third group contains a class of cases with a distinct syndrome. According to Duane, who has carefully analyzed these symptoms, there is a deficiency in abduction and adduction with a retraction of the globe, narrowing of the palpebral fissure and oblique movements of the eye. According to Duane, Turk's theory is that the retraction in these cases is due to the inflexibility of the external rectus, and this Duane believes also explains the absence of adduction and insufficiency of convergence. Others believe that the retraction is due to insertion of the internus too far back, and as in some of the lower animals the internus is inserted on the posterior aspect of the globe, it is looked upon as atavistic anomaly. The oblique movements of the globe Duane considers to be due to excessive spasmodic contracture of the inferior oblique. Parker attributes the closure of the palpebral fissure to some peculiar associated movement produced by synergic action of the facial and oculomotor nerves. This group also contains the cases to which Fuchs probably first called attention. In some instances the upper lid is raised in attempts at adduction and falls in abduction, while in others the phenomena are the reverse of this, while in still others (but one instance so far reported) there is a relaxation of one lid in adduction and of the other lid in abduction. There may be paralysis of the interni or of the externi, or of both, and usually there is ptosis. Fuchs considers that these associated movements are similar to the involuntary movements which occur in paralysis

of muscles of the extremities, and may be accounted for by assuming that the excessive nerve energy which is supplied to the paralyzed nerve overflows into the neighboring nuclei.

The anomalous associated movements present in the case about to be described seem to be of rare occurrence, the only other instance found by the writer being that recorded by



FIGURE 2.

Looking to the right. Brow level.

Wilbrand and Sanger in "Die Neurologie des Auges," an accompanying illustration showing the anomaly. The case is in many particulars like my own.

H. L., male, Hebrew, age twenty years, single, employed as a shipping clerk, came to Wills Hospital February 7, 1914, to have his left eye, which had turned in since infancy, straight-

ened. He thinks that the sight has failed some in this eye in recent years. He has had no serious illness and is at present in good health. He is well built and well nourished, and presents an unusually symmetrical face and skull. There is an esotropia of 12° , the right eye being the fixing eye. (Fig. 1.) Irides react normally to light and convergence. In movements of the eyes to the left, there is marked limitation of the excursion of the left eye unless he is made to fix intently, when the excursion becomes almost full. When the eyes are turned towards the right, there is slight limitation of the outward excursion of the right eye. (Fig. 2.) As the fixing object is carried to the left, the left eye halts when it reaches the median line, and the elevation of the left brow begins as soon as the external rectus begins the outward rotation of the globe, and reaches its maximum when the eye by forced action reaches the external canthus. The elevation of the brow is most marked in its outer third. This contraction of the frontalis is not accompanied by either an elevation of the lid or a widening of the palpebral fissure. (Fig. 3.) In attention in the primary position, in looking to the right and in looking up, there is a just noticeable tremor of the eyebrows at the root of the nose. There is no secondary deviation. When the right eye is closed and the left eye made to fixate, the outward excursion of the left eye is quite as full as that of the right when looking to the right. In adduction the right eye is also slightly infraducted. There is no ptosis and no palsies of any of the other ocular muscles.

The ophthalmoscopic examination shows: O. D., pinhead sized congenital opacity on the posterior capsule of the lens; disc round; no noticeable changes in the fundus; H. = 3.5 to 4 D. O. S., media clear; disc oval, axis 105° ; H. = 5 to 6 D.

O. D., 6/6; O. S., 3/60.

O. D., + 4. $\overline{25}$, cyl. axis 180° , 6/6.

O. S., + 4. $\overline{1}$, cyl. axis 180° , 6/20.

Dr. T. H. Weisenburg, who kindly made the neurologic examination, reported that the findings were negative. In connection with the eye condition he notes that in shutting both eyes there is a twitching of the whole face. The brows are well corrugated. The left eye cannot be shut as well as

the right, and, curiously, the movement in shutting is just in those parts where the twitching occurs. In shutting both eyes at the same time there is no difference in the degree of closure, but a greater contraction and fibrillar tremor of the whole brow which extends to the temporal surface of the ear.

Wilbrand and Sanger's case is as follows: A man, thirty-



FIGURE 3.

Looking to the left. Left brow elevated, due to contraction of frontalis.

four years of age, on recovering from severe cerebral syphilis, presented the following phenomena: In looking to the left the left palpebral fissure was strikingly wide, so that a broad band of sclerotic was visible above the upper corneal margin; simultaneously, through contraction of the frontalis muscle,

the left eyebrow was drawn up. The left eyeball was incapable of going beyond the middle line in looking towards the left. In looking to the right the movements were normal, and none of these phenomena were present. As there was no secondary deviation, and as the patient never had diplopia, notwithstanding the absolute loss of abduction, the condition is considered a congenital one. The authors say that in this case it is evident that the elevation of the upper lid is due not to innervation of the levator but of the frontalis. Ptosis was not present. The reproduced photograph of the case illustrating the text shows an extreme widening of the palpebral fissure.

In some of the cases belonging to group 3 an anatomic anomaly has been demonstrated, admitting of a plausible explanation for the phenomena, but in all of the other cases it is possible only to conjecture how this anomalous association is brought about. In the case here reported the nerves supplying the muscles involved have a very close nuclear origin, and while, so far as I am aware, no connecting fibers have been demonstrated to exist normally between them, such as serve in the presence of a paralysis of one muscle to predicate an overflow to the nucleus of the other, it is not improbable that in this case such a connection exists anomalously.

III.

OUR PRESENT KNOWLEDGE OF FOCAL LOCALIZATION ALONG THE VISUAL PATHS.

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When the discovery of the ophthalmoscope had enabled us to diagnose the intraocular affections, the amblyopias due to diseases of the visual paths behind the eyeball were still a dark chapter. The evolution of our knowledge in this respect is certainly the most interesting part of the advance in ophthalmology since that time. This progress took place within the memory of the older members of the profession. Microscopic anatomy, physiology, experimentation, and careful clinical observations worked harmoniously to achieve the desired end.

It is not more than about half a century since the partial decussation of the optic nerve fibers in the chiasm was uniformly accepted by the medical profession. Up to that time the anatomists, amongst them the famous Kölliker of Würzburg, maintained the total decussation. Hemianopias had of course been observed before; they were not unknown to the old Greeks. But, although some ophthalmologists postulated the partial decussation of the optic nerve as the only anatomic basis for a rational explanation of the hemianopias, the anatomists stood firm by their opinion; they left it to the former to explain hemianopia on the basis of a total decussation as well as they were able. The change of opinion took place when Gudden proved that in all the higher vertebrates a partial decussation of the optic nerves occurred. The absolute proof for a partial decussation in man came soon afterwards. In a case where one eye had been lost since childhood and where a postmortem was obtained some decades afterwards, Warrington and Dutton could demonstrate that the ascending arch of the optic nerve fibers continued backward into

both optic tracts. Other observations confirmed this first one, and soon afterwards the semidecussation was generally adopted by the profession and our knowledge of the hemianopias put on a firm anatomic basis.

The next pioneer in this field was Mauthner. He gave the explanation and differentiation of the various forms of hemianopia: that the homonymous forms were caused by lesions behind the chiasm, and the bitemporal and binasal forms by a lesion of the chiasm. At that time no case of binasal hemianopia was known. But Mauthner, a man of great ingenuity, postulated (in 1872) the possibility of such an affection. He stated that a disease located symmetrically on the right and left side of the chiasm and affecting the noncrossed fibers only, was bound to cause binasal hemianopia. A few years later such a case was reported, and the cause was found to be two tumors, located symmetrically on both sides of the chiasm.

During the following decades our knowledge progressed along two distinct lines. The course of the fibers of the optic nerve supplying the different portions of the retina was traced backward through the nerve and the chiasm into the optic tracts, and the fact was established that the ultimate center of vision was located in the cortex of the occipital lobe.

The advance along the former line we owe mainly to the researches of Samuelsohn (1882), Vossius (1882), Nettleship, Bunge (1884), Uhthoff (1886), Henschen (1892), Bernheimer (1891-1900). Their findings have been uniform, and we can make the following statements with certainty: The macular bundle occupies in the optic disc and immediately behind it a temporal sector comprising about one-fourth of all the nerve fibers. Then it turns toward the center of the optic nerve and reaches this position about midway between the eyeball and the optic foramen. It retains this central position in the posterior portion of the nerve as well as in the chiasm and in the optic tracts, although its configuration changes. On a cross section in the middle of the optic nerve the macular bundle is about round; farther back it becomes oval, with the horizontal diameter double as long as the vertical; in the chiasm this oval is still more elongated (horizontal diameter: vertical diameter = 1:6, and in the optic tract it is again reduced 1:2). The uncrossed bundle

is located at first above and below the macular bundle, then these two portions unite in a ventrolateral bundle, which takes a lateral position farther back. In the chiasm the crossed bundles occupy the central portion, whilst the noncrossed bundles make up the lateral portions. But after their decussation the crossed and noncrossed bundles change their position, so that in the optic tract the crossed bundle is lying ventrally and the noncrossed bundle dorsally. In the tract we find besides a distinct third bundle, which overlies the dorsal bundle—the so-called Gudden's commissure. This set of fibers loops around the posterior angle of the chiasm and enters the opposite tract. The function of this set of fibers is not known, neither is the function of Meynert's commissure, and they are therefore of no diagnostic value.

The optic tract enters through the pulvinar into the primary optic centers, namely, thalamus opticus, the nucleus hypothalamicus, geniculate bodies and corpora quadrigemina. Of these the lateral geniculate body seems to be the most important. According to Monakow, eighty per cent of the visual fibers terminate there. Bernheimer (1891), from his minute researches, could not find a positive proof for a connection of the corpora quadrigemina with the visual fibers, and his findings are as follows: A large number of the visual fibers can be traced into the lateral geniculate body and a smaller number into the mesial geniculate body; furthermore, there are fibers which terminate in the thalamus opticus, and others of about the same amount in the hypothalamic nucleus (*corpus luyss*).

The pupillary reflex was known for centuries; and it was also assumed for a long time that the center for this reflex was located somewhere in the corpora quadrigemina. The exact knowledge of the path of the pupillary fibers we also owe to the researches and elaborate experiments of Bernheimer (1899). He proved in the first instance that not only the visual, but also the pupillary fibers undergo a semidecussation, so that each eye sends pupillary fibers to both reflex centers. Their course is as follows: They run in conjunction with the visual fibers into the lateral geniculate bodies. There they depart from the visual fibers, run along the inner border of the inferior corpus quadrigeminum, where they form a compact stratum. This stratum runs in a curve convexly upward

to the superior corpus quadrigeminum, and enters its substance in the form of a fan. There, in the superior corpus quadrigeminum, we have the reflex center. Bernheimer was furthermore the first one to prove anatomically the connection between this center and the nucleus of the third nerve. Out of the superior corpus quadrigeminum connecting fibers run around the lateral wall of the aqueduct of Sylvius to the nucleus of the motor oculi, which is located just below the aqueduct. These fibers are nonmedullated. Bernheimer supposes, and some experiments seem to favor this supposition, that the nuclei of the third nerve are also united by communicating fibers. The anatomic proof for such a communication is still wanting. If it should exist there would be a twofold possibility by which irritation of one eye can produce a pupillary reflex of the fellow eye: by the mentioned semidecussation in the sensory portion of the reflex arc, and by these communicating fibers in the motor portion.

Bach assumes a second more remote center for pupillary reflexes within the lower part of the medulla oblongata, which controls the dilator muscle; but the data are still too meager to be used for diagnostic purpose.

Whilst in the optic tract we can distinguish the different bundles, as mentioned above, we are not able to do the same with regard to their termination in the different portions of the primary center; nor do we know whether different functions are connected with these. According to Monakow, "the nerve fibers end in the lateral geniculate bodies in the sense of a projection of the homonymous halves of the retina; probably in such a manner that a crossed and a noncrossed fiber approach closely and arboresce together into the neurons." Henschen attempted to prove, by the findings in two cases, that a localization exists in these ganglia. According to Piersol, it is probable that a limited number of retinal fibers pass directly into the cortex without interruption in the primary center; and furthermore, that other centrifugal fibers establish relations between the cortex and the nucleus of the oculomotor nerve by way of the quadrigeminal bodies. All these statements, however, demand more positive proof.

A summary of our positive knowledge up to date may therefore be stated as follows:

1. The primary visual center is situated in the lateral and

mesial geniculate bodies, in the thalamus opticus and in the hypothalamic nucleus; but mainly in the first one of these ganglia. A differentiation between them as to function or localization is at the time impossible.

2. The pupillary reflex center is situated in the superior corpus quadrigeminum, and is connected with the retina of both eyes.

The communication between the neurons of the primary center and the ultimate center in the occipital lobe is by way of the optic radiation. This is a well defined set of fibers, which sweep outward and backward into the cortex. From the thalamus, etc., they pass at first through the hindermost portion of the capsula interna; later on they form the central part of the corona radiata. In the corona radiata we find three oblong strata of fibers, which are arranged concentrically and which may easily be separated. The mesial one is the tapetum nigrum, which contains association fibers between the occipital and the parietal lobes, i. e., between the visual center and the motor centers; the lateral one is the inferior longitudinal fasciculus, which carries association fibers from the occipital to the temporal lobe, i. e., from the visual to the acoustic center; between these two strata lies the optic radiation. This at least is the generally accepted view. But Flechsig considers the inferior longitudinal fasciculus as a part of the optic radiation, consisting of centrifugal fibers which run from the calcarine fissure to the primary optic center. The location of the optic radiation between the mentioned strata is of course of importance for topical diagnosis. Henschen concludes from a few cases that the fibers coming out of the pulvinar are contained in the dorsal, and the fibers from the geniculate bodies in the ventral portion of the optic radiation. With the exception of this possibility, nothing is known of the arrangement of the different fibers within this stratum.

According to Toldt, the gyri and sulci of the occipital lobe are more variable than those of the other lobes, and the matter is complicated by divergencies in nomenclature.

The occipital lobe presents a lateral or convex and a mesial surface.

On the convex surface Ecker and all the textbooks of the last century describe three occipital gyri, a superior, a mid-

dle and an inferior; whilst Toldt and Piersol divide them into two groups, a superior and a lateral one. This latter view has been accepted in the Basel nomenclature. On the mesial surface there are two gyri, the cuneus and the gyrus lingualis; between these two there is the calcarine fissure. Monakow mentions a third one, the gyrus descendens, which unites these two around the end of the calcarine fissure. It forms the very end of the occipital lobe.

The majority of the visual fibers go to the mesial gyri. The cortex of the occipital lobe presents an anatomic feature which distinguishes it from all other cortical regions. This is the stripe of Gennari, a white band which runs parallel with the contours of the cortical surface. It can frequently be seen with the naked eye, better after staining. It consists of medullated nerve fibers. It is always present in the mesial gyri, but more or less wanting in the lateral gyri. Wilbrand and Saenger attach great importance to Gennari's stripe, although we are in the dark as to its function.

Graefe, in 1860, was one of the first to make the statement that affections of vision in consequence of diseases of the brain must be of the hemianopic type; but he could not give a pathologic basis for his views. In 1866 Lewick (*American Journal of Medical Science*) published a case of hemianopia due to an abscess in the right occipital lobe. During the following decades cases of a similar character multiplied. At the same time the famous experiments of Fritsch, Hitzig and Munk in regard to cerebral localization drew the attention of the medical profession to this question. In 1883 Wilbrand could collect twenty-three cases of cortical and subcortical hemianopia with postmortem findings. In the beginning of this century over two hundred cases were on record in literature, the collection and classification of which we owe to Henschen and Vialet.

That the ultimate center of vision is located in the occipital lobe is now accepted as an established fact. An exact limitation of the visual sphere in which the optic radiation terminates is at the time impossible. But most authors are inclined to the view that the center of vision occupies the mesial portion of the occipital lobe around the calcarine fissure and that its three lobes, the cuneus, the lobus lingualis, and the gyrus descendens participate in it to about an equal extent.

This area would coincide with the portion in which Gennari's stripe is constantly found. But there is still considerable diversity of opinion. Huguenin, for instance, accepts only the region around the calcarine fissure; Seguin exclusively the cuneus; Nothnagel the cuneus and the superior occipital gyrus; Ferrier says that the gyrus angularis is the region for the most distinct vision.

Concerning the respective significance of the different gyri, the finer localization and the possibility of special centers for special parts and special functions of the retina, there is also considerable dispute. Wilbrand advanced the opinion that there were in the occipital cortex three concentric areas; that the innermost one was the center for light sense, the middle one for the form sense, and the outermost one the center for the color sense. Although he tried to prove this theory by a number of cases, they are far from being convincing, and his hypothesis needs more exact proof before it can be accepted. The main difference of opinion, however, exists in regard to the question, whether or not different portions of the visual area correspond to respective portions of the retina; in other words, whether the visual area in the cortex can be considered as a projection of the retina. This query includes, of course, the important question, whether the macula lutea is represented by a special center, and if so, where this is located.

The dispute over these points was rather lively during the last two decades. The most important publications on the subject are:

Wilbrand: *Hemianopische Gesichtsfeldformen*, 1890.

Henschen-Nordenson: *Klinische und anatomische Beiträge zur Pathologie des Gehirns*, Vol. I-IV, 1892, etc., to be continued.

Gowers: *Nervous Diseases*, 1892.

Vialet: *Les Centres cérébraux de la vision*, 1893.

Wilbrand: *Die Doppelversorgung der Macula*, 1895.

Edinger: *Ueber die Entwicklung des Rindensehens*, 1895.

Monakow: *Gehirnpathologie* (in Nothnagel's Handbook), 1897.

Bernheimer: (in new Graefe-Saemisch), 1900.

Henschen: *La Projection de la Retine sur la Corticalite calcarine*, 1903.

Wilbrand and Saenger: Vol. III, 1904, page 146, etc., and page 352, etc.

Wehrli: Ueber die Grundlage der Rindenblindheit, etc., Graefe's Arch., 1906.

Inouye: Die Sehstoerungen bei Schussverletzungen der corticalen Sehsphaere, 1909.

Behr: Zur topischen Diagnose der Hemianopie, Graefe's Arch., 1909.

Lenz: Zur Pathologie der cerebralen Sehbahn, etc., Graefe's Arch., 1909.

Henschen: Ueber circumscriphte Nutritionsgebiete im Occipitallappen, etc., Graefe's Arch., 1911.

Henschen: Ueber circumscriphte Nekrosen im Sehnerven, etc., Graefe's Arch., 1911.

The foremost representatives of the different views are Monakow and Edingen on the one side, Henschen and Wilbrand on the other. The view of the former may be termed the "Dezentralistic," that of the latter the "Zentralistic" theory. Monakow rejects the possibility of an exclusively cortical hemianopia. He maintains, that in all such cases, the lesion is not confined to the cortex, but that the white matter—i. e., the optic radiation—is always involved more or less; and that if such an involvement is not visible macroscopically, it can be demonstrated microscopically. He bases his opinion upon the pathologic character of the most frequent affections, softening and hemorrhage, and also tumors, in which the lesion is always more or less diffuse. He refutes the idea of Wilbrand, that the cortical region is a projection of the retina, on the ground this hypothesis does not take into consideration that the optic tract ends in the neurons of the primary centers, and that there is no isolated or direct communication between the retina and the cortex. Upon the basis of the facts that hemianopia has been caused by lesions in widely different parts of the visual sphere; that in the majority of such cases the macula remains unaffected and its function fairly well preserved; and that an indubitable case of an isolated macular affection has not been met with thus far, he formulates his opinion (*loco citato*) as follows: "The macula is already especially richly represented in the lateral geniculate body, so that there is always a connection between the macula and the cortex, unless the entire optic

radiation is interrupted. Certainly, the representation of the macula is not limited either to the center of the visual area or to the periphery of it; it is rather to be supposed that no portion of the cortex of the occipital lobe is left unconcerned in the representation of the macula, and that possibly the hindermost portion of the gyrus angularis may also participate. In other words, the macular field goes beyond the cortical portions, which are generally accepted as the visual area, and is to be sought in the extensive cortical associations which emanate from the visual area proper."

Bernheimer (new Graefe-Saemisch, page 99) arrives at the following conclusions: "Although this hypothesis of Monakow is not proven in all points by anatomic and pathologic or experimental data, I am inclined to accept it as the best substantiated. My own investigations lead me to similar conclusions. In the terminal portion of the optic tract, just before it enters into the lateral geniculate body, the crossed and non-crossed bundles of nerve fibers cannot be separated any longer; they intermingle, and a cross section at this site shows a complete mixing. My investigations have furthermore shown that all the mixed fibers enter the geniculate body, radiating to all parts of this ganglion."

Wilbrand and Henschen are the advocates of the "Zentralistic" or projection theory. In order to explain the frequent preservation of the central vision, Wilbrand assumes that the macula has a double representation—i. e., that every point of the macula of one eye is represented in the cortex of each hemisphere—and that after destruction of the macular area in one, its partner in the other hemisphere would act as a substitute. Furthermore, he considers it probable that besides the macula, other portions of the retina near the vertical meridian are doubly represented. This hypothesis is rejected by Monakow as being unsubstantiated. Henschen, in his essay of 1903, considers the question of the projection of the retina upon the cortex as solved. According to this author, the center of visual perception is located only in the mesial portion of the occipital lobe, in the region around the calcarine fissure. Moreover, he holds that the upper quadrant of the left half of the retina of each eye corresponds to the cortex immediately above the calcarine fissure of the left hemisphere; and that the lower quadrant of the same halves

corresponds to the cortex below the calcarine fissure. And he localizes in the depth of the left calcarine fissure a central ribbon-like portion of the retina between the two quadrants. The same he holds good for the right side. Henschen assumes also a localization in the primary centers, based on his findings in two cases; he lets the dorsal portion of the lateral geniculate body correspond with the homonymous upper quadrant of the retina.

Wehrli, a disciple of Monakow, analyzed carefully all the cases upon which Henschen and Wilbrand build their theories (*loco citato*, 1906). He arrived at the following conclusions: That in every case reported, the destruction was not limited to the cortex, but involved more or less the white matter (optic radiation); and that up to date not a single case purely cortical is on record; and that with this premise all the far-reaching conclusions based upon the position and extent of purely cortical lesions fall. He also rejects the cases by which Wilbrand attempted to prove the position of the center of the macula and the theory of its double representation in the cortex. In his résumé he repeats that the "Dezentralistic" conception of Monakow is still the one on which the anatomic, physiologic, and pathologic facts can be best explained without contradiction.

In the latest communication on this subject (1911), Henschen answers the objections of Monakow-Wehrli and promises a more elaborate criticism in the near future. Some of the cases of Henschen and also of Inouye seem to substantiate the claim of a special representation of the macula. One of the most convincing is the case of Eggers, (Henschen, *Path.*, etc., Vol. IV). This patient had a homonymous horizontal scotoma commencing at the macula. The postmortem showed, as predicted by Henschen, a circumscribed malacia in the cortex, in the depth of the calcarine fissure. A more elaborate synopsis of this and other important cases bearing on this question will be given in another article.

From what has been said, it is apparent that the opinions vary widely, that facts are mixed up with a number of theories, and that an unprejudiced sifting of the two will be necessary. Generally speaking, we may say that the data for localization in the visual sphere of the cortex are not yet sufficient for positive statements in one or the other direction.

IV.

INTRAOCULAR SARCOMA—WITH REPORT OF A CASE OF SPONTANEOUS RUPTURE OF THE GLOBE.

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Sarcomata of the uveal tract is the most common form of tumor growth found in the eye. From the collected studies of this form of tumor by such men as Fuchs, Collins and Lawford, Wood and Pusey, Kerschbaumer, Knapp and Oatman, it may be said to occur once in seventeen hundred patients. This, however, must be considered only in the light of an estimate, because it is impossible to determine exactly the frequency of its occurrence.

In this brief paper we will consider only one phase of the question of intraocular sarcomata, and that is the course. This has been divided into four different stages:

1. Preglaucomatous.
2. Glaucomatous.
3. Extraocular extension—optic nerve or orbit.
4. Metastasis—viscera or brain.

In the earliest or preglaucomatous stage there are usually no symptoms of irritation or pain, and upon the location and size of the growth will the amount of visual defect depend.

If the growth is posterior to the median line of the globe, it is usually possible for one to mark out an area of scotoma corresponding to the size of the tumor.

When the tumor is anterior to the median line of the globe, there is usually no defect of vision demonstrable, and not until the tumor grows to a considerable size or a detachment of the retina has taken place will the patient be aware of the presence of any ocular trouble.

The preglaucomatous stage may extend over a period of months, rarely lasting over a year.

Second Stage.—The stage of glaucomatous symptoms is

quite frequently accompanied with signs of inflammation. Many of these eyes having sarcomatous growths never develop glaucomatous symptoms. If, however, the growth sets up inflammatory symptoms, glaucomatous tension usually accompanies the onset of the inflammation or follows very soon after.

It seems safe to say, in regard to the etiology of the increase of tension in these eyes with sarcomata, that it is not due to the same cause in each case.

In some of the eyes in this series there were no symptoms of inflammation present, but the location of the growth was a sufficient cause to explain the presence of increased intra-ocular tension.

The cause of the increase of tension being a purely mechanical one, either direct pressure upon the angle of the anterior chamber, or the pushing forwards of the vitreous, lens and iris, and thus causing a blockage of the angle and the canal of Schlemm.

A certain number of the cases presented a fairly large sized tumor in the vitreous chamber without any apparent increase in tension, as far as could be determined by a microscopic examination.

Unfortunately no tensions were recorded in any of the cases in this series. This is a very valuable point in making a differential diagnosis in an obscure case with a circumscribed detachment of the retina. The use of the tonometer may be the means of settling the disputed point in the diagnosis. It has been suggested that the increase of tension was due to pressure of the tumor upon one of the *venæ vorticosæ*, and thus preventing the outflow of venous blood from the eye, but to compensate for this obstruction a collateral circulation is established through the anterior ciliary vessels.

In a certain number of cases of sarcoma we find a cellular, fibrinous and sometimes pigmentary deposit in the angle of the anterior chamber, and also in the pectinate ligament. This condition has not been sufficiently constant, and therefore much importance cannot be attached to the presence of these deposits.

A very rare complication that is sometimes seen in eyes with sarcomatous growths is spontaneous rupture of the globe with extrusion of the contents of the eye. The rupture

usually takes place through the cornea instead of the corneoscleral margin, which is the most usual place for rupture of the eye to occur. Just what is the actual cause of the rupture is still in doubt, as only a very few cases of this sort are on record. It seems rather doubtful that the gradual increase in the size of the tumor is sufficient to rupture the globe. What is more reasonable is that there is a sudden rupture of some of the intraocular blood vessels with a sufficient hemorrhage to raise the tension of the eye to the point of rupture. This is the reason given by Voerhoff (*Archiv. Ophthalm.*, XXXIII) for three of his cases reported at that time, and is the explanation advanced for the case reported in this paper.

Voerhoff reports four cases of spontaneous rupture of the globe from intraocular sarcomata, and from a very careful study of the literature finds it an extremely rare accident. He calls attention to the fact that this condition may be very easily overlooked, and eyes of this kind may be diagnosed as cases of hemorrhagic glaucoma or glaucoma with hemorrhage.

The case report is a patient from the service of Dr. Wotton. When the eye was sectioned in the laboratory, ten days after its removal, it was thought to be glaucoma with hemorrhage causing the spontaneous rupture of the cornea, and upon more careful study of the specimen, at the request of Dr. Wotton, the presence of a neoplasm was demonstrated. When the eye was sectioned it was found that there was present a rupture of the cornea, with some of the intraocular contents of the eye in the lips of the wound. The lens was extruded and the anterior chamber and the vitreous chamber filled with what appeared to be a hemorrhagic mass.

LABORATORY REPORT IN FULL.

Gross Pathology (hardening in ten per cent formalin.)—The eyeball was completely stained with blood. There was a large ragged wound near the center of the cornea about eight millimeters long, and the edges of the wound were gaping and filled with blood stained tissue.

SECTION.

Macroscopic Examination.—The globe was slightly misshapen and measured 21x23 mm., and a goodly portion of the optic nerve was obtained at time of enucleation for study.

The wound of cornea was entirely filled with hemorrhagic mass, and the anterior chamber partially destroyed, and the iris was prolapsed forward against the cornea, and the lens was completely extruded from the eye. The ciliary body was being pulled and pushed forward, and there was a large mass which entirely filled the vitreous chamber that looked like an organized blood clot. The retina was completely detached and the choroid only partially. The optic nerve did not show any changes.

Microscopic Examination (celloidin, van Geisen, hematoxylin and eosin).—The mass that was found on the cornea at the site of rupture consisted of broken down fibers of the lens and remnants of its capsule. There is considerable free hemorrhage and fibrin seen, and a part of the iris and retina, more or less disorganized, help to form this mass. There is a free leucocytic invasion and purulent material about the corneal edges of the wound and near the limbus of the cornea. Some pigment granules are to be seen, which no doubt owe their origin to the iris.

Cornea.—The rupture is very readily seen and the edges of the corneal wound are reflected out and back towards the limbus. The edges of the wound are rough and uneven. The epithelial layer and Bowman's membrane are entirely missing, and in the most superficial layers of the corneal stroma is seen a rapid invasion and disintegration by the pus cells, which also are producing necrosis of this portion of the cornea. The corneal stroma shows a splitting up of the separate layers of this tissue with cloudy swelling. There are to be seen remnants of Descemet's membrane in fairly good condition, showing its highly resistive properties.

Anterior Chamber.—This is entirely obliterated, and some parts of the ciliary body and its processes are seen adhering to the posterior surface. The detached retina helps to fill up the anterior chamber with the hemorrhage.

Iris.—There are no traces of the iris to be seen inside of the eye, and this is also true of the crystalline lens, as both of these tissues have been completely extruded from the eye at the time of rupture.

Ciliary Body.—There is almost a complete detachment of the body on both sides, and it is retained to the sclera only at the point of attachment of the ciliary ligament. The ciliary

body is pretty well disorganized and swollen—so much so that it is most difficult to make any sort of a study of it.

Retina.—This has evidently been partly extruded from the globe, and the portion that remains is pushed up to the inner part of the wound. Down and out there is still some partly degenerated retina attached to the surface of the tumor.

Choroid.—This is detached to a slight degree in about one-half of its area, and shows tremendous engorgement of its vessels. The tumor seems to have had its origin in the posterior third of the eye, quite near the optic nerve.

There are several large subchoroidal hemorrhages which are pushing the tumor mass outwards and forwards. The largest one is in the anterior third of the choroid, reaching clear up to the ciliary body and pushing it forward, literally tearing it from its base. There are several smaller hemorrhages near the middle third, and still others seen between the choroid and the body of the tumor.

In the sarcoma itself there are a number of smaller sized hemorrhages, and with all of this free bleeding it is easy to understand the occurrence of rupture of the globe.

Optic Nerve.—This was very carefully studied in the longitudinal and transverse sections, and we were unable to find an extension of the tumor cells along this pathway.

Sclera.—It does not show any erosion of the tumor, nor is there the slightest tendency shown towards extension of the sarcoma along this channel.

Relation of the Tumor to Eye.—As has been stated, the tumor has taken its origin from the posterior third of the choroid, and there is a small area of this membrane that shows a point of origin of the sarcoma, but the real base of the tumor is not seen in any of the microscopic sections. At this point the tumor is torn away from the choroid and no direct point of contact can be found, but this portion of the choroid is without the retinal pigment layer which is found at all other points.

Principal (Essential Tumor) Cells.—The sarcoma is made up of the small spindle and the small round cell. There seems to be a fairly even distribution of these two forms of cells throughout the tumor. The spindle cells do not show the characteristic tendency to form themselves into whorls, but assume with the round cells a rather free and open for-

mation. The two varieties of cells show a tendency to rapid cell division, and the nucleus is rather small in both types of cells.

The Blood Vessels.—This is an extremely vascular tumor and presents a great number of blood vessels, the same as one usually sees in sarcoma. The great majority of these vessels are without the regular vessel walls, with a marked tendency to bleed into the tumor. There has been considerable free bleeding into the sarcoma, with no secondary degeneration of the growth, which would seem to prove that these hemorrhages had been quite recent. There is this very large subchoroidal hemorrhage which has been already mentioned, occurring on the one side and forcing the tumor and the ciliary body forward, together with a large hemorrhage lying between the sarcoma and the choroid on the opposite side of the globe, and it is these two hemorrhages which were the direct cause of the corneal rupture.

The Pigment.—There is only one small portion of the tumor where any pigment is seen, and its origin is undoubtedly from the ciliary body and its processes. It is broken up into fine granules, and does not show any tendency to hyperplasia. This is one of the purest types of a leucosarcoma that we find. Leucosarcomata are very rare, and many of the cases so recorded have not been sufficiently studied and the diagnosis is often made from a macroscopic examination alone.

V.

CURVATURE AND INDEX MYOPIA, WITH REPORT OF CASES.

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NEW YORK.

CURVATURE MYOPIA.

This condition may be due either to an excessive curvature of the cornea or of either surface of the crystalline lens. In a normal eye curvature myopia rarely exceeds in amount more than one or two diopters, in fact, seldom reaches that amount. When of considerable or large amount it is always associated with pathologic conditions, as conical cornea or conical lens, and in such conditions there is also an irregular astigmatism to deal with. As cases of conical cornea are not so uncommon, that condition may be passed over in this brief paper. Cases of posterior lenticonus are comparatively common also, while anterior lenticonus is extremely rare, less than a dozen cases being reported in all literature. One such case in which both eyes were affected, I have reported in my book on the Refraction of the Eye. On account of the exceeding rareness of such cases, I venture to give a brief résumé of it here.

Case 1.—J. L. H., aged fifty-seven years, a lawyer, in good health, consulted me because of a severe migraine. At the time he consulted me he was wearing for reading:

R., + 2.50 D. cyl. 180° \ominus — 3 D. cyl. 90°.

L., + 2.50 D. cyl. 180° \ominus — 1.50 D. cyl. 90°.

The ophthalmometer showed a regular astigmatism with the rule of 2 D. in each eye. The patient accepted for the distance:

R. V. = 20/200 : 20/50 w — 5 D. \ominus — 2.50 cyl. 90°.

L. V. = 20/200 : 20/30 — w — 1 D. \ominus — 3 D. cyl. 75°.

For reading:

R., — 1 D. \ominus — 2.50 D. cyl. 90°.

L., + 3 D. cyl. 165°.

These glasses gave entire comfort. In this case, because of the great discrepancy between the astigmatism, as indicated

by the instrument, and that found on subjective examination, I immediately suspected some trouble with the lens—an incipient cataract perhaps. On examination with the ophthalmoscope I found no opacity of the lens whatever, but to my surprise a transparent protuberance of a conical shape on the front surface of the lens of each eye. The corneæ were perfectly clear, except for a very minute opacity just to the outer side of the center of the left. The shadows reflected from the pupil resembled in a marked degree the shadow crescents seen in conical cornea. I could not get a double image of the fundus by the direct method with the ophthalmoscope, as did Webster in his case, the first of this kind reported; however, I did not have the pupil dilated as he did, and besides, the conicity was not so marked in my case as in his, so far as I can judge by reading the account of his case and looking at the excellent diagrams he gave.¹ With the indirect method, however, I got a decided diplopia of the retinal blood vessels, both vertical and horizontal; also the parallax movement by which the double images could be made to approach toward, or recede from, each other by the slightest movement of the ophthalmoscope or object lens. The fundus was normal in each eye.

According to my own tests, when he came to me, he must have had a lenticular astigmatism against the rule of 4.50 D. right and 5 D. left, in order to have a total astigmatism against the rule of 2.5 D. right and 3 D. left, because he had 2 D. of corneal astigmatism with the rule in each eye.

Case 2.—The following case, in my opinion, is one of curvature myopia, though not susceptible of undoubted demonstration: Mr. L. C., aged forty-seven years, sent to me January 2, 1914, with history of several attacks of iritis in the last eleven years, affecting first one eye, then the other. Gives a doubtful specific history, but has had mixed treatment off and on, also tuberculin treatment.

Present Condition.—Javal equaled astigmatism with rule 1.50 D. 90 + 180 — in each eye; horizontal meridian of the cornea equaled 44 D. and vertical equaled 45.50 D. each.

R. V. = 20/20 — : 20/20 w. — 1 cyl. 180°.

L. V. = 20/50 : 20/50 + w. — 1 cyl. 180°.

In right eye there is a mild iritis with complete posterior synechiae, except a space of about 1 m. directly above, which

is free; atropin fails to dilate pupil; fundus normal. Left eye shows signs of the previous attacks of iritis, operative coloboma above, and posterior synechiæ binding down remainder of iris. Tension normal each eye; right, 15; left, 22, by tonometer.

The patient was placed on local treatment of atropin and hot fomentations, and his family physician gave him mixed treatment of mercury inunctions and increasing doses of iodid potassium. In the meantime I gave him diagnostic tuberculin injections, but these were negative. At the end of ten days, January 10th, the iritis had grown worse and his vision reduced to 20/100 plus, increased to 20/40 w. — 1 D. \ominus — 1 cyl. 180° .

January 29th, the iritis was greatly improved, no pain and the eye only a little red, but the vision was reduced to 20/200; with 3 D. \ominus — 1 cyl. 180° , this was brought up to 20/20 plus. One per cent atropin had been used in this eye three times a day all the while.

March 13, 1914, two and one-half months after the patient came under treatment, R. V. = 20/20 — : 20/20 $^+$ w. — 1 cyl. 180° . The eye is entirely quiet. The patient sees almost as well without the glass, squinting the lids, as with it when leaving the eyes wide open.

The ophthalmometer showed no change in the curvature of the cornea when the myopia was at its greatest amount, 3 D., than at the beginning and at the close of the treatment, running uniformly at 44 D. in the horizontal meridian, and 45.50 D. in the vertical. Because of the narrow pupil the examination of the lens curvatures with the Souter ophthalmophakometer was not very satisfactory, though the posterior surface indicated about .50 D. astigmatism against the rule. I am unable to account for the myopia in this case, unless it be due to the increase in the curvature of the lens surfaces, or to increase of the index of refraction of the lens. It certainly was not due to an increase in the refractive index of the aqueous, as this remained clear, and there was no sign of diabetes at any time, which might give rise to such a condition of increase of index of refraction.

The possibility of the traction of the iris on the lens capsule (there being present an almost complete posterior annular synechia), when the iris was acted upon by the atropin, has suggested itself to me. By pulling the capsule slightly for-

ward, this would allow the lens to expand and increase the curvature of the anterior surface. Or this increased curvature of the lens could be explained by ciliary spasm, due to the irritation from the inflammatory process, which was not relieved by the use of the atropin until the inflammation had subsided.

Hess (cited by Parsons)² has reported a myopia of 5 D. which developed in an eye during iridocyclitis.

INDEX MYOPIA.

This may be caused by an increase in the refractive index of the cornea, aqueous, or the lens, or to a decrease in the refractive index of the vitreous. Well authenticated cases of any considerable amount of myopia due to an increase in the refractive index of the aqueous humor have not been reported. Parsons states that to produce myopia of 1.50 D. to 2 D. would require that the aqueous have an index equal to that of the cornea.

The myopia of diabetes cannot be explained by increase in the aqueous index. The aqueous would have to contain twenty per cent of sugar in order that its refractive index be raised to that of the cornea, a result which would cause a myopia of only 1.50 D. in a previously emmetropic eye. Moreover, a concentration of even five per cent of sugar, according to Deutsmann, would cause opacity of the lens.

Again, cases of myopia due to decrease in the refractive index of the vitreous humor have not been reported, though Landolt⁵ has reported hyperopia in a diabetic as due to an increase in the refractive index of the vitreous. The most common form of index myopia is that occurring in old people, due to an increase in the refractive index of the crystalline lens, especially in the nucleus of the lens. This change in the refractive index of the lens in the aged, together with a slight swelling, is accountable for the cases of so-called second sight. This index myopia of the lens in the aged, however, as is well known, is usually followed in a short time by formation of a cataract, so that second sight, as a rule, ends in no sight at all. There are a few rare exceptions to this rule, where the second sight is retained for years.

This myopia in the aged, as the result of the increase in the refractive index of the lens, may be of rather large amount,

Landesberg having reported as high as 10 D., Fuchs 9 D., Herrnheiser 7 D., Weeks 6 D., while many other cases of lesser amount have been recorded.

The following case of 2.50 D. of myopia in patient aged seventy-five years, is of added interest because a beginning opacity in one lens cleared up in the six years the patient was under observation.

Case 3.—April 25, 1908, M. G. H., aged sixty-nine years, in good health. Javal equals astigmatism w. r. .50 D. axis $90^\circ + 180^\circ$ — each eye.

R. V. = 20/100 — : 20/15 w. + 1.50 D.

L. V. = 20/100 — : 20/15 w. + 1.12 \odot .37 cyl. 180° .

Jaeger number one equals eight to twenty inches w. plus 3.50 D. added. Ophthalmoscope shows incipient cataract in the right eye, one spicula in the inferior nasal quadrant. Left eye normal. Ordered distant and near glasses.

February 3, 1914, six years later, the patient returns, complaining that she sees better in the distance without any glasses, and says she uses the distance glasses now to read with. The ophthalmometer gives the same reading as at first test:

R. V. = 20/30 : 20/15 — w. — 1 D.

L. V. = 20/30 — : 20/15 — w. — 1 D.

Reads Jaeger number one, eight to twenty inches with plus 2.50 D. The opacity in the right lens has disappeared. The patient is in good health. Ordered plus 2.50 D. for reading. No distance glasses.

INDEX MYOPIA DUE TO DIABETES.

Case 4. Index Myopia From Diabetes.—Mrs. S. B., aged forty-two years, consulted me first June 15, 1907, because of headaches when she read. Javal showed astigmatism .50 D. with the rule in each eye.

R. V. = 20/20 — : 20/15 w. + .25 cyl. 70° .

L. V. = 20/20 — : 20/15 w. + .50 cyl. 110° .

Jaeger number one, eight to eighteen inches with plus .75 D. added. Normal fundi. Ordered reading glasses.

December 2, 1908, about eighteen months later, patient returned because her vision was poor for the distance. Corneal astigmatism the same as at previous test.

R. V. = 20/100 : 20/20 — w. 1.25 D. \odot — .25 cyl. 160° .

L. V. = 20/70 — : 20/20 — w. — 1 D. \odot — .50 cyl. 20° .

Fields normal. Ophthalmometer shows normal fundi. No lens opacities.

Because of this change to myopic refraction, diabetes was suspected, and an examination of the urine showed a large amount of sugar, 7.7 per cent by polariscope, and strong reactions to Fehling's and Nylander's tests. Specific gravity, 1037.

The patient was placed on a strict nonsugar diet, also given small doses of arsenic, and has been kept under frequent observation for the last seven years. Two months after the sugar appeared in the urine there were faint striæ of opacities at the periphery of the right lens in the superior temporal quadrant, but these have not advanced.

At present R. V. = 20/15 w. — 1.25 D.; L. V. = 20/15 w. — 1 D. The highest myopic refraction reached was: right, — 2.25 D. \odot — .25 cyl. 160°; left, — 1.50 D. \odot — .25 cyl. 20°. At each exacerbation of sugar the patient had small round hemorrhages, from one or two to six or eight, appearing in the retina. These have been always absorbed without injury to the vision. The patient was in good health, but must keep on diet. She also took the arsenical preparation. Tension of eyes remained normal (15) by the tonometer.

Case 5. Index Myopia From Diabetes.—September 11, 1913, Mr. H. H., aged forty-two years. Six days previously to consulting me he noticed that his vision became rather suddenly blurred for the distance and has continued to grow a little worse since. Until now his vision has been good.

R. V. = 20/200 : 20/30 — w. — 1.50 D. \odot — .50 cyl. 165°.

L. V. = 20/200 + : 20/20 — w. — 1.50 D. \odot — .50 cyl. 15°.

Ophthalmoscope shows rather pale optic discs, especially on temporal half. No retinal hemorrhages. Examination of urine shows large amount of sugar, 9.99 per cent by polariscope. Fields normal. Tension normal. This patient was seen the second time two days later, and was somewhat improved in sight—under strict diet. He has not been seen by me since; therefore I do not know the progress in his case.

REFERENCES.

1. Webster: Archives Ophthal. and Otol., Bd. Vol. IV, 1874-1875, p. 482.
2. Hess: The Pathology of the Eye, Vol III, p. 929.
3. Landolt: The Refraction and Accommodation of the Eye, p. 419.

VI.

A CASE OF PERSISTENT RING SCOTOMA FOLLOWING REPEATED AND PROLONGED GAZING AT A FURNACE FIRE.

J. HERBERT CLAIBORNE, M. D.,

NEW YORK CITY.

A young man, age thirty-six years, about five feet eleven inches in height, strong, heavily built, in perfect health, consulted me January 27, 1913, concerning a dark ring he had noticed some time before in his left eye. He was a mechanical engineer and had been experimenting for nine months burning various kinds of fuel in a furnace. He was accustomed to look at the fire through a round door. About six months after he started these experiments he noticed the dark ring mentioned. The fires, as a rule, were bluish white, and from time to time he would notice the phenomenon which one sees after looking at the bright disc of the noonday sun—namely, a dark spot in the field corresponding to the sun disc. He used Euphos glasses to see what effect they would have upon this particular phenomenon, and found that they temporarily relieved him very much. He became alarmed at the ring scotoma, although with the affected eye he could see nearly as well through the ring as he could with the other eye.

Vision in the right eye 23/20 with plus 0.50; left eye, 23/20 (?) with plus 0.50. Belladonna failed to reveal any more hypermetropia; direct pupillary reactions and accommodation in each eye equal; consensual reaction slightly diminished in right eye, though normal in left; optic nerves on both sides remarkably red; veins enlarged; and in right eye there was a pulsating vein; otherwise there was no other change in the fundus of either eye; central color perception for red and green normal in both eyes; pulse 78; blood pressure 150; kidneys normal; field of vision as shown in the two cuts.

In Figure 1, field was drawn by the patient himself at the

desk on a piece of white paper, while he fixed the cross shown in the field. The distance at which this was done was the ordinary distance of reading or writing, about eighteen to twenty-four inches. It will be observed that the field drawn by him and the one recorded by myself by the perimeter are considerably alike. The region of the scotoma is indicated by pencil strokes in the field drawn by himself. The scotoma was not absolute—that is to say, was not perfectly black. The field taken by myself is very much smaller, but was taken much nearer to the patient's eye—this is natural. I think that

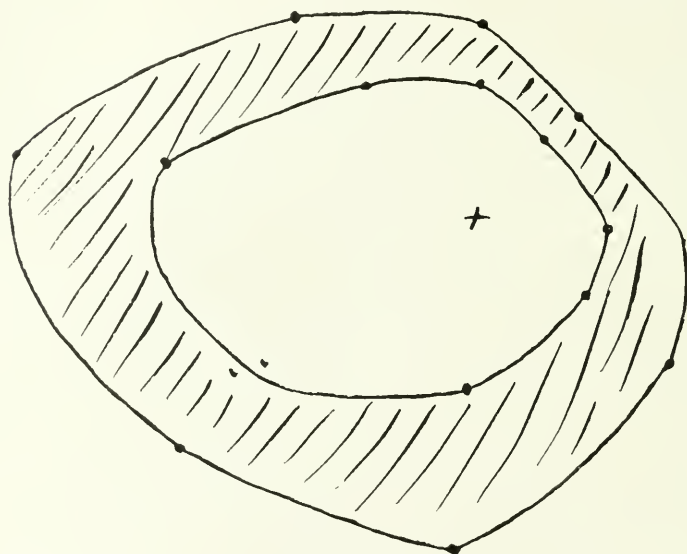


FIGURE 1.

Field of vision as drawn by patient.

when patients are intelligent, it is well to get them to draw their own fields, particularly in cases of scotoma. It is my frequent practice to have them do so. I do not remember to have seen any fields drawn by patients themselves in any other cases than those reported by myself. I think it is the truest expression of the field when the patient is intelligent. At the best, however, no field is absolutely correct, and will vary in every case to some degree on each occasion on which it is taken.

I had the patient under observation for a couple of months; it is now nearly twelve months since the scotoma was first noticed, and there has been no change whatever in it. I believe there will be none. I believe the injury, whatever it is, is per-

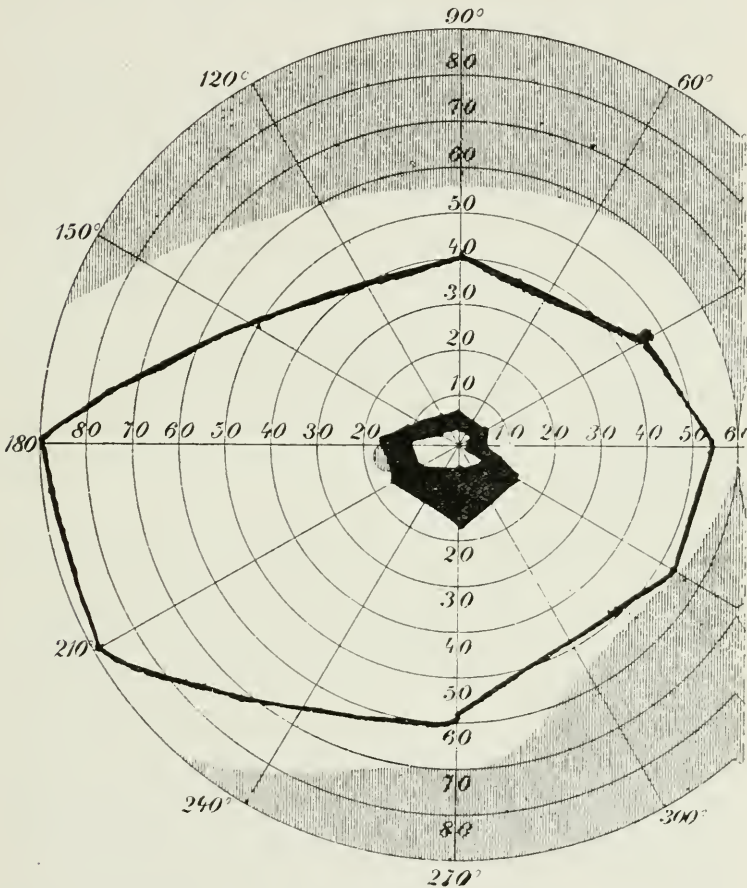


FIGURE 2.

Field of vision as recorded by the perimeter.

manent. The lesion doubtless lies in the retina of the left eye; I do not think it lies in the cerebral cortex. It is worthy of remark that the scotoma is a ring shape one, with clear center and dark ring, though the patient gazed directly into a circular opening in the furnace.

Adolf Jess (*Arch. f. Aug.*, 74, page 78) examined a number of patients following the eclipse of 1912. The vision in a number of cases was considerably diminished. He observed in all thirty-six cases, and in twenty-six a total or partial ring scotoma was found. The scotoma always passed, but in six cases persisted for some time.

Majewski refers to the large number of scotomata occurring during the last total eclipse, in its long course from Lisbon to St. Petersburg. The author suggests that the public should be warned before each eclipse of the danger of looking at the sun with naked or insufficiently protected eyes. He points out that inasmuch as each ecliptic period completes its revolution in eighteen years, forty-one eclipses are included, and that at least one occurs every two years at the same point on the terrestrial sphere. The danger period, therefore, occurs every two years. He suggests that the proper authorities should call attention to these periods and proper instructions be given to prevent injury to the eyes. The danger is not confined to total eclipses, but likewise may take place in partial ones, and, in fact, the latter appear to me to be the most dangerous, since in them the entire disc of the sun is not covered by the shadow of the moon.

The total eclipse occurs when the moon is in perigee—that is, nearest to the earth; the disc of the moon exactly covers the disc of the sun, and just beyond the umbra or dark spot is the lighter shadow or penumbra; beyond these are brilliant streamers, tongue shaped as a rule, with intense diffuse illumination in addition. Since the image of the dark disc of the sun falls upon the macular region when it is observed, and the brilliant illumination at the edge of the shadow falls in a ring shape upon the surrounding retina, it is not unnatural that the scotoma should be ring shape, and that vision through the center of the ring should be better. While, however, the character of the scotoma is reasonable in the presence of these phenomena, it seems an annular eclipse should more certainly produce a ring shape scotoma and a more permanent one, because in annular eclipse the moon is in apogee—that is, furthest from the earth—and consequently its diameter is less than that of the disc of the sun; therefore her disc does not fully cover that of the sun and her visible portions appear in the form of a brilliant ring. The intensity of the illumination of this

brilliant ring is greater than that of the corona of streamers which takes place in a total eclipse, hence the ring shape scotoma should be more marked and more persistent. I venture to suggest that if in the future comparisons are made along these lines, the facts will be found to tally with this conclusion.

It will be observed also in this case that the peripheric field of vision is somewhat restricted, which is consistent with the retinal exhaustion due to prolonged gazing at a fierce light. Owing to the fact that the patient can see perfectly with the other eye, and practically perfectly through the ring of the scotoma in his left eye, he is able to pursue his profession, and, though conscious of the defect in the field, is able to ignore it.

The phenomena in the case I have just reported are completely the reverse of those which occur in the eclipse of the sun. In the latter the dark image falls upon the macular region, and the periphery of this dark image is brilliantly lighted. As already stated, the ring scotoma is the natural result of this, through retinal exhaustion at the periphery of the circle, and the absence of it within the area of the circle. In this case the patient looked directly into the intense white circle, beyond the periphery of which there was darkness or less illumination. Nevertheless, almost the same result occurred as after the eclipse. A ring scotoma is present, the patient can see through the center while he cannot see through the band of the ring. The conditions are apparently diametrically opposite to those in the eclipse, nevertheless the results are practically the same.

It will be remembered that the patient looked directly into a circular fierce light, and that frequently he observed afterwards the fleeting central scotoma which one notices after looking at the uncovered disc of the sun. One would naturally expect from this a central scotoma and not a ring scotoma, yet a ring scotoma occurred.

Let us look at the anatomy of the macula for a moment. In the center of the macula, at the fovea centralis, there are only cones, but around the macula there are rods and ganglion cells in abundance, and it is well known that the visual purple resides solely in the rods.

We may explain the recovery of the central vision in our case on the theory that the cones in the fovea recovered their

sensibility, and the persistence of the ring scotoma on the theory that the peripheric rays from the aperture in the furnace permanently destroyed or impaired the visual purple or the ganglion cells, or both, in the circummacular region.

Ordinarily, staring at the uncovered disc of the sun produces temporary scotoma, but we must remember that the gaze under such circumstances is more or less fleeting, whereas in this case the act was repeated for nine months constantly.

As already pointed out, a ring scotoma after annular or total eclipse is reasonable, by reason of the escape of the fovea centralis from the sun's rays, and by reason of the fact that the peripheric rays fall where both rods and ganglion cells abound.

I am not aware that anyone has established the fact that the visual purple can be completely destroyed in life or that its destruction has ever produced permanent scotoma. It remains likewise for someone to demonstrate what the effect of intensely white light on the ganglion cells is. Nevertheless, from an academic standpoint the explanation given for ring scotoma in this case appears reasonable and consistent with the anatomy of the parts involved.



VII.

A CASE OF COMPLETE SCLEROSIS OF THE RETINAL CIRCULATION.

WILLIAM ZENTMAYER, M. D.,

PHILADELPHIA.

The unusual fundus condition of which the accompanying water color by Miss Margaretta Washington is a satisfactory reproduction was seen in the right eye of a man thirty years of age, who came to Wills Hospital on March 10, 1914, in the last stages of chronic interstitial nephritis, a pathetic picture of a large framed, once vigorous and powerful man fighting desperately for breath. He complained of shortness of breath, nervousness and failing vision in the left eye. He stated that some time between his fifth and tenth year he had whooping cough, and that within this same period he lost more or less completely the sight of the right eye. He does not remember the sequence of these events. He had no other serious illness until 1909, when he had a chancre with the usual secondary lesions. In 1910 he had a second venereal infection, which he also termed a chancre. He took mercury and potassium iodid for two and one-half years after the first infection. He was married in 1912 and has a healthy child ten months old. He is a heavy smoker, and uses whiskey irregularly to excess. His mother, who is living, suffers from rheumatism. His father and a baby brother died of pulmonary tuberculosis. He has been nervous and short of breath for some months, being compelled at times to sleep in a sitting or reclining position. He had no trouble with the sight of the left eye until March 7th, when he found that his sight was blurred and foggy. This grew rapidly worse, so that in a short time he could not much more than see daylight. Gradually, however, slight improvement took place.

Physical Examination.—Orthopnea. Large bubbling rales over the entire chest. Heart rapid, but the sounds could not

*Read before Wills Hospital Ophthalmic Society, April 7, 1914.

be studied on account of the adventitious sound in the lungs.

Urinalysis.—Urine neutral; specific gravity, 1012; four per cent albumin (Esbach method); many coarse granular casts.

Vision.—O. D., blind; O. S., 6/40.

Ophthalmoscopy.—Right eye. A beginning secondary posterior cortical cataract somewhat obscures the view of the fundus. The papilla, which appears unusually large, as seen through the lenticular haze, is chalky white and filled in. The retinal vessels are converted into dead-white ribbons tapering towards the periphery of the fundus. Only the main branches are visible, and these cannot be traced as far out onto the retina as normally. The arteries are indistinguishable from the veins. In two of the branches a hair line red reflex can be with difficulty detected in a short section of the vessels on the surface of the papilla. Nowhere in the fundus can any other recent or old lesion be made out. The fundus of the left eye presents the picture of a typical albuminuric neuroretinitis. There are many fluffy white areas, numerous hemorrhages, and marked edema of the papilla and surrounding retina.

That the condition in the right eye long antedates his present illness is evidenced by the secondary cataract and the advanced sclerotic changes in the retina. Such complete obliterating endarteritis and perivasculitis I have neither before seen in life, nor do I remember having seen in any atlas or other publication. It is not unusual in advanced arteriosclerosis to find a branch or a section of branches of the retinal vascular supply obliterated and converted into white cords or bands, but to see the entire arterial and venous retinal vascular trees thus altered must be very unusual. It probably represents the end results of obstruction of the central artery of the retina, either from embolism, thrombosis or hemorrhage into the sheath of the nerve, or it may be a syphilitic process.

Although the patient realized the seriousness of his condition, he feared to enter the hospital, but finally yielded to our persuasion. Under a too aggressive therapeutic attack his condition became alarming, but by equally active counter attack, after five or six days he improved sufficiently to be removed to a general hospital, where he died one week later. I am indebted to Dr. Carson for the carefully taken history of the case.

VIII.

DR. HASKET DERBY.

When Doctor Derby began practice in Boston, fifty-two years ago, specialties were so infrequent as to be singular, even questionable. The name oculist could not be attached to the usual affix of M. D. The eye was the only recognized single organ; and, as we still hold, was influenced by the brain and the kidney. The oculists in the community had been evolved from general practitioners.

Dr. Derby never practiced medicine. He was a pure specialist from the beginning; and being one of the earliest to divert his business from his family and home, he occupied an office in another street. This was novel and unusual.

Social connections and business tact combined to give his real merits an earlier recognition and success than usually befalls the young doctor. It was true that two and a half years of special study of the eye in Germany and Holland had given him unusual opportunity for complete knowledge. But he was successful from the beginning, soon had a good practice and income, and kept it for forty-eight years.

Dr. Derby was a man of very strong religious convictions, and he gave unquestioning faith to the assurances of his church. This influenced his professional character and practice. He was conscientious; his medical dicta were conservative but unyielding. What he knew, he knew he knew; and there was no latitude allowed. The effect of positive statement to the patient is great; and the sufferer who accepts is happier and better off than he who doubts, questions or changes.

Dr. Derby was considerate to the poor, and gave long years of gratuitous hospital service. But he also was eminently just, and this made him firm in claiming his dues when the patient could afford them. He was a bold and earnest assailant of the abuse of medical charity. He often questioned the applicant for free treatment at the Eye and Ear Infirmary as to his means, and sometimes refused him as a free patient. This vast abuse, which impoverishes the doctor, would be

lessened were other practitioners as firm in claiming what they believed was right. No such inquisitorial duty should ever be imposed on the hospital doctor, but it should be taken up by a special officer of each hospital.

The writer of this notice, being retired by age, and thinking himself in a position to judge impartially, wishes to call attention to the circumstance, that every doctor connected with a hospital makes his charity practice primary and his paying practice secondary. He gives up the fresh energy of his morning hours to his charity work, and has only the later and tired hours to give to those who pay him for his services and support him.

The subject of this sketch was a man of polished manners and genial conversation. He was a pleasant companion. He made warm friends and kept them. He had a cultivated taste for English literature, and he collected a fine library of such classics. He was familiar with German and French, and read both with ease. He was fond of nature and developed the scenic features of Mt. Desert. There he was also instrumental in building a rural church, which he named Saint Sylvia. He paid scrupulous attention to bodily exercise, and was for years a regular attendant of a class in gymnastics. His exact habit of mind led him to keep and preserve copious notes of each one of his patients.

Dr. Derby was born in June, 1835, and died in August, 1914. He had entered upon his eightieth year. He led a serviceable life up to old age, and had little illness. About four years before his death infirmities settled on him which obliged him to retire from practice.

Dr. Derby was graduated from Amherst College in 1855; entered the Harvard Medical School, and received the degree of M. D. in 1858.

During the last year of his medical studies he served as house surgeon of the Massachusetts General Hospital. He then at once sailed for Europe as ship's doctor of a sailing craft, and had a voyage of twenty-eight days.

He studied general medicine for eighteen months, and then took up the eye, first in Vienna under von Arlt and Jaeger; then in Berlin under von Graefe; in London under Bowman and Critchett, Greenfield and Hutchinson; in Utrecht under

Donders; and in Paris under Desmarres and Sichel. To these studies of the eye he devoted two and a half years.

While in Europe the Civil War broke out, and he desired to come home and enter the military service; but his parents wished him to complete his studies. When he returned he volunteered and served under the Sanitary Commission at Fortress Monroe.

He settled in Boston in 1862. He was one of the surgeons of the Massachusetts Charitable Eye and Ear Infirmary for thirty years. He founded the Eye Department of the Carney Hospital in 1877, and retained his connection there thirty-seven years.

He was a founder, and later chairman, of the New England Ophthalmological Society. The American Ophthalmological Society was originated by Dr. Derby and Dr. Henry D. Noyes, of New York. Dr. Derby was later its president.

He was many years a member of the Deutsche Ophthalmologische Gesellschaft.

He was a lecturer on the eye at the Harvard Medical School for a short period. Clinically, he taught for years in hospitals.

He filled many public offices: for ten years a trustee of the Children's Institutions Department; he was one of the original Board of Visiting Physicians of the Danvers Hospital for the Insane.

Dr. Derby often went to Europe, when he brought home the newer ideas in his specialty and novelties in his armamentarium. He was especially fertile in employing new machinery.

In 1868 he was married to Sarah Mason, of Boston, who survives him. They had eight children, of whom six are living, namely, Eloise and Dr. George S. Derby, of Boston; S. Hasket, of San Francisco; Robert M. and Augustin, of New York; and Arthur L., of New Orleans.

D. W. CHEEVER.

ABSTRACTS FROM ENGLISH OPHTHALMIC
LITERATURE.

BY

WALTER R. PARKER, M. D.,

DETROIT.

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EDWARD C. ELLETT, M. D.,

MEMPHIS.

GEORGE S. DERBY, M. D.,

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**Some Points in Connection With the Operation of Sclerocorneal
Trephining.**

ELLIOT, R. H. (*Ophthalmoscope*, October, 1914). The paper deals with some of the difficulties and dangers of the operation of trephining, which can be minimized or avoided by the adoption of a correct technic.

(1) The vesicular type of filtration scar is not a necessary sequel of the sclerocorneal trephine operation. Experience shows it is due to faulty technic and carries with it two dangers, viz.: (1) The risk of abrasion of the prominent surfaces during movements of the globe, and (2) the risk of infection in consequence of the scanty protection which is afforded by a very thin covering of the filtration area.

Technic.—The flap must be made as large as possible, the first incision passing almost up to the fornix, and the extremities of this incision must be kept well away from the limbus. It is not even necessary to make the conjunctival incision concentric with the limbus; it is sufficient to make a long cut slightly concave downwards, i. e., towards the cornea.

Secondly, the whole area outlined by the flap must not be dissected up. The aim should be to produce a wide area for slow filtration, in which meshes of the tissues are damaged as little as possible; in doing so we must avoid two evils, viz.: On the one hand the formation of large fluid reservoirs, and on the other, the destruction of our filtering area by the formation of cicatricial bands running between the flap and its bed. We shall best attain our object by reducing the area we dissect to a minimum, and leaving as much as possible of the connective tissue of the flap uninterfered with. The path of the dissection, from the conjunctival incision as a base, to the limbus, must resemble in shape a truncated triangle, very wide above, and gradually narrowing below until it reaches the cornea, when its width is only sufficient to allow of our having room comfortably to carry out the necessary manipulation of splitting of the cornea. If this technic is adopted, the tissue at the sides of our wound remains undamaged, and thereby a double advantage is gained: (1) A check ligament-like action of the tissue thus left springs the flap back into position as soon as the downward drag on it is released, and makes it lie in good position without being stitched, and (2) the widest possible area of undamaged subconjunctival tissue is left for the purpose of filtration.

Thirdly, whilst the upper half or more of the flap need include little more than the conjunctiva itself, we should as we approach the limbus work down to the sclera and should lay the latter bare in the last few millimeters of our dissection. By so doing, we insure the base of the flap being made as thick as possible. I believe that the formation of projecting vesicular scars is due to the neglect of this very obvious indication.

Lastly, we come to the splitting of the cornea; and I desire here to lay emphasis on the point that what we should aim at is to "split" this membrane, and not merely to cut it.

All conjunctivocorneal flaps must include some of the corneal lamellæ, and the thickness of the corneal base of the flap

can easily be made such that the resulting wound covering is not vesicular in type.

(2) The impaction of uveal tissue in the trephine hole is one of the gravest misfortunes which may occur in a sclero-corneal trephining.

Either the iris or the ciliary body, by far more frequently the former, may become impacted in the trephine hole. Such impactions may take place (1) as the result of injudicious traction during the iridectomy; (2) in consequence of a sudden movement of the patient at that time; (3) owing to a forward movement of the structures lying behind the diaphragm of the eye, which mechanically push the uveal tissue into the wound, and block them there; and (4) as a result of the iris becoming washed into the hole by the fluid which is making its way from the anterior chamber to the subconjunctival space. The last-named factor differs from the other three in that it comes into play after the patient has left the operating table.

The writer advises that an iridectomy should always be performed, if possible, and prefers the peripheral buttonhole iridectomy, made opposite the trephine hole. A sluice gate is thus provided for the escape of aqueous fluid, and the risk of the iris being washed into the wound is thereby greatly diminished. The complete iridectomy advocated by other writers is not advised because of the following objections, viz.: (1) It tends to cause blurring of images; (2) it exposes the patient to unnecessary dazzling, and (3) it deprives the surgeon of the power of inducing strong miosis, should he desire so to do. The avoidance of quiet iritis is due rather to the greater mydriasis after complete iridectomy, and this indicates the advisability of using atropin freely in the after-treatment.

The technic of performing the iridectomy with the same snip of scissors that divides the hinge of the disc, enables the operator to steady the eye whilst the iris is being cut, and but rarely allows the iris to become impacted in the trephine hole.

When impaction of iris has actually occurred, it is important to decide whether this is due to tissue having been dragged into the wound by faulty manipulation, or having been pushed there by the pressure of structures behind. The latter condition is shown by a sudden hardening of the eye

whilst the patient is still on the table, due to an effusion (probably a transudation from the choroidal veins) into the posterior segment of the eye. Under these circumstances, any prolonged manipulation, such as the effort to push back protruding uveal tissue with a bent spud, is inadvisable. The patient should be quickly and quietly put back to bed. On the other hand, if the eye has remained soft, it is not difficult to effect replacement of impacted uveal tissue with a spud, should the irrigator stream alone prove insufficient.

(3) The control of the result obtained by a correct gradation of the piece of sclera removed.

To obtain the best results the size of the piece of sclera removed should vary in different cases. A very small fistula suffices in a very chronic case of noncongestive glaucoma, while in the case of an eye with a very high tension and history of repeated attacks, there is a double indication for making a large opening, viz.: (1) The need for a free drainage channel, in order to cope with the comparatively large volume of fluid which presumably needs to be drained away, and (2) the necessity of allowing for the possibility that the hole will tend to be closed by connective tissue, owing to the inflammatory condition present. Between these two extreme cases many intermediate forms will lie.

The principles of technic by which considerable control may be exercised over the size of the fistula are shortly reviewed. The blade of the trephine should be held so as to cut through the corneal edge first. The disc, hinged on its scleral side, will be pushed forward by the prolapsing head of iris. Both disc and iris are seized in a single grip of the iris forceps, turned out and cut across with one clear snip of the scissors, cutting at right angles to the surface of the disc. This produces a fistula which does not slant and is of the same caliber throughout. When only a small piece of scleral tissue is to be excised, the blade is slanted in such a way that the hinge left comprises a full third of the circumference of the disc and only a small piece is removed from the corneal side.

The above method has two advantages: (1) The fistula will be removed as far as possible from the dangerous neighborhood of the angle of the chamber, and (2) in cutting the hinge the risk of buttonholing the flap will be reduced to a minimum.

(4) Late Infections.

1. The proportion that such failures bear to the enormous number of cases operated on is not large.

2. The operation is not a matter of choice to the patient, and risks are taken which, because of the urgency of the condition, are justifiable.

3. These risks may be greatly reduced by a correct technic.

4. Later infections are on record as following other operations as well as trephining.

5. Some of the cases classed as late infections are really early infections, as the ordinary operative infections, or following blows or other injuries.

6. The great stress that has been laid on "thin flaps" in this connection, although very desirable, may be exaggerated if it leads surgeons to forget the importance of two other factors, viz.: (1) The inclusion of uveal tissue in the wound, and (2) the possibility of the existence of a fistulette somewhere along the line of the original conjunctival incision; such a fistulette may easily provide a channel of infection. Fortunately, however, it is as easy to recognize such a fistulette as it is easy to close it, a touch of silver nitrate solution sufficing for the purpose.

IV. R. P.

The Sclerocorneal Trephining Operation for Glaucoma.

COLLINS, E. TREACHER (*Ophthalmoscope*, October, 1914). The writer gives the results gained from the microscopic examination of sections of eyes with cystoid cicatrices, as to the conditions necessary for the formation of a filtering cicatrix.

(a) The establishment of a permanent gap in the endothelium of Descemet's membrane the most essential feature in the operation.

The experiments of Leber demonstrated that what prevents the filtration of the aqueous humor into the substantia propria of the cornea is the endothelial lining of Descemet's membrane.

From this experiment it would seem that the first essential factor in the formation of a permanent filtration scar is to establish a permanent gap in the endothelium lining Descemet's membrane, and this is probably brought about in sclerocorneal trephining by the size of the gap being too wide to allow the endothelium to extend across it.

It is always desirable that the piece removed should include a complete disc of Descemet's membrane.

There are two reasons why it is undesirable that the opening should be made further inwards than is necessary to insure the removal of a complete disc of Descemet's membrane: (1) Because the escaping fluid has ultimately to be taken up by the blood vessels which terminate at the sclerocorneal margin, and the nearer the channel of exit from the eye is to them, the more easily is such absorption effected; and (2) because the filtration of aqueous humor into clear cornea makes it opaque.

(b) How the patency of the opening made in the sclerocorneal tissue is maintained.

After removal of a portion of the iris, the cut surface, if kept aseptic and bathed by the aqueous, does not close. In an avascular tissue like the cornea, there is even less tendency, under like conditions, for the union of the edges.

In the operation of sclerocorneal trephining, where a wide gap is left in Descemet's membrane which cannot be bridged over by endothelium, the edges of the wound remain permanently bathed by the aqueous humor escaping from the eye. Provided the parts are kept aseptic, no granulation tissue is formed to fill up the trephine hole, and it persists as a permanent fistula.

(c) Importance of the conjunctival flap in preserving a sterile condition of the trephine hole.

A large conjunctival flap is necessary to preserve the trephine hole from contamination with microorganisms in the conjunctival sac. A mild infective inflammation started in the trephine hole excites the production of granulation tissue which may lead to its closure.

To such infection is probably also attributable the mild quiet iritis which has been observed sometimes to follow the operation. As a safeguard against the disasters that may arise from this complication, Elliot advises the early and systematic use of atropin after operation.

(d) Importance of the conjunctival flap in preventing down-growth of surface epithelium.

In order that the surface epithelium may not find its way into the trephine hole, it is important that the opening made in the former should be as far removed from the latter as possible. The formation of a large conjunctival flap obviates such a complication. It might, however, arise, if in dissecting

up the flap a buttonhole was accidentally made in it just opposite the position of the trephine hole. Elliot's plan of splitting into the anterior layers of the cornea tends to lessen the risks of this accident.

W. R. P.

**The Present Status of the Heterophoria Question.
(Concluded.)**

REBER, WENDELL (*Ophthalmoscope*, October and November, 1914).

Diagnosis of Heterophoria.—Nearly every method employed today falls in one of three classes, namely:

First.—The diplopia test as first employed by von Graefe. Familiar examples of this principle are to be found in Stevens' phorometer and the Maddox prism verger.

Second.—Distortion or deforming tests. In these one image of the light is so distorted by some manner of refracting device, that the normal tendency to fusion is momentarily set aside and any latent deviation tendency revealed. The Maddox rod (simple or compound) is the almost universally employed type of this test. Many other devices have been advocated from time to time, but none has equaled the Maddox rod in simplicity, ease of use and accuracy.

Third.—The cover or screen test, which dates back many years. It furnishes so much useful information, so quickly and so easily, that it should be resorted to in every case.

In tests at the reading or occupation distance, the author uses the Maddox rod, the patient holding a tiny electric light at the reading distance, so that as soon as the infinity finding is recorded the reading distance status is simply and easily arrived at.

Then removing the rod from the trial frame and having the patient gaze steadily at the electric light, it is carried closer and closer to the eyes in the median line, until one or both eyes break away from the effort to fuse. In this way the convergence near point is readily determined.

For estimate of the prism convergence, single prisms, a battery of prisms or the rotary prism of Jackson or Risley are needful. The Maddox prism verger is very useful for this purpose.

Nomenclature.—That suggested by Stevens many years ago has been pretty widely accepted, namely:

Orthophoria.—Perfect or mathematic binocular balance.

Heterophoria.—Imperfect binocular balance. Heterophoria naturally presents many varieties, towit:

Esophoria.—A latent tendency of the visual axes to swing inward.

Exophoria.—A latent tendency of the visual axes to swing outward.

Hyperphoria.—A latent tendency of one visual axis to deviate above that of the other.

Hypophoria.—A latent tendency of one visual axis to deviate below that of the other.

Combinations of the above as follows:

Hyperesophoria.—A latent tendency of one visual axis to deviate upward and inward.

Hyperexophoria.—A latent tendency of one visual axis to deviate upward and outward.

Hypo-esophoria.—A latent tendency of one visual axis to deviate downward and inward.

Hypo-exophoria.—A latent tendency of one visual axis to deviate downward and outward.

To these may be added:

Anaphoria.—A latent tendency of the visual axes to deviate above the horizontal plane of the head.

Kataphoria.—A latent tendency of both visual axes to deviate below the horizontal plane of the head.

Cyclophoria.—An insufficiency or overaction of the obliques; seen principally in connection with oblique astigmatism.

Concerning orthophoria, a patient presenting two degrees or esophoria for infinity, and anywhere from balance to two degrees of exophoria for the reading distance, is considered well adapted for prolonged use either at infinity or the reading distance. The term "relative orthophoria" or "euphoria" has been suggested for this.

Esophoria.—Esophoria is commonly associated with hypermetropia or its allied conditions. Analysis of the refraction status in one hundred cases of esophoria reveals eighty-six of the allied hypermetropic status and fourteen of the allied myopic status.

When esophoria is greater at the reading distance than for infinity, it is likely to be the expression of some fault of the

accommodation. When esophoria for infinity is associated with four or more degrees of exophoria at the reading distance, there is often an associated hyperphoria, manifest or latent, as a complicating feature. In the uncomplicated forms the wearing of the proper correction will in the majority of instances care for the esophoria.

For the type of cases who show residual discomfort when the correcting glasses are worn, prism exercise with careful attention as to the detail of carrying it out, does well in some cases, but oftener is not tolerated. Lateral rotation, in which the patient with the head held steady in the primary position turns the eyes as far to the right as possible, and then returns them to the primary position, repeating the act to the left, has been of great value in esophoria. The writer's experience is strongly in favor of the helpfulness of weak prisms continually worn. Permanent prisms have been resorted to as a means of relief also in myopic esophoria, and the results have more than justified the writer in the practice. Only one tenotomy has been performed in a series of five hundred esophorics. It is not the patient with esophoria of twelve degrees who requires treatment of his muscular balance, but the patient with esophoria, whether of six or twelve degrees, who has symptoms attributable to his esophoria, who requires treatment for his condition.

Exophoria.—Exophoria is classified as

1. Accommodative—when found in myopia.
2. Exophoria (in the presence of $h + Ah$) with normal divergence and deficient convergence (true convergence insufficiency).
3. Exophoria (in the presence of $H + Ah$) with normal convergence and excessive divergence.
4. Exophoria (in the presence of $II + Ah$) with convergence and divergence both subnormal. In such a case—if there is no complicating hyperphoria—it is probably a myasthenia, part of a general process in which constitutional treatment is the main thing.

In (1) myopic exophoria there is more or less of a ratio between the degree of exophoria and the grade of myopia. In most of such cases if a full correction of the myopia is given while the patient is young, the normal relation between accommodation and convergence is fairly well established and

the exophoria is so slight in degree as to become a negligible quantity.

The main difficulty arises with hypermetropic states attended with either convergence insufficiency or divergence excess. These call for refinement of diagnosis. In all such cases it is well to learn the prism divergence, the prism convergence, and the convergence near point.

As to the treatment, myopic states of refraction should be fully corrected and hypermetropic ones undercorrected. Rational living comes first in the treatment of all muscular imbalance. Training of the convergence faculty in some fashion is of first importance. Prism training is much in vogue and is done in many ways. Prisms should always be mounted in some manner of frame. Converging exercise on a lead pencil point brought from arm's length to the convergence near point also are most helpful.

If permanent prisms are resorted to, it is good practice not to prescribe prisms totaling more than one-quarter of the infinity deviation at the outset. In two or three years it may become necessary to add one-half to one degree of prism to each eye. This can often be avoided by combining convergence exercises with the use of permanent prisms when the eyes have become habituated to the latter. It is surprising how such patients tolerate convergence training when once their convergence forces have had some rest.

One class of cases, mostly presbyopes, present but one or two degrees of exophoria for infinity, with anywhere from ten to fifteen degrees for near. These respond well to convergence training.

But twenty-two of five hundred exophorics have come to operation, and tenotomy is favored as infinitely more accurate than advancement.

Hyperphoria.—Hyperphoria, like esophoria and exophoria, is simply a term of clinical convenience. The visual tests simply indicate that one visual axis is higher than the other. Some refinement of diagnosis is required to determine which is the abnormal axis, and at times this is not possible.

Three methods are in vogue for this purpose. First, estimation of the supra- and infraduction; second, estimation of the arc rotations with the tropometer; and third, a small elec-

tric lamp may be carried into the extreme upper left and right binocular fields in an attempt to elicit diplopia.

As contrasted with esophoria or exophoria, which will vary from time to time, hyperphoria is amazingly constant in its degree, even for years.

Like exophoria, hypophoria is much more in evidence between the years of thirty and fifty, while esophoria belongs to the earlier decades of life.

Prism exercise for the relief of hyperphoria has been an utter failure. Vertical rotational exercises have been helpful in but a few instances.

On the other hand, rest prisms are generally conceded to be of great value in hyperphoria. Brilliant results often attend their use. Full prismatic correction of a hyperphoria at the start is not often indicated. It is a much safer (and saner) practice to incorporate not more than one-third to one-half the infinity deviation in the refractive correction to begin with. In other words, it is wise to feel one's way, for prisms at first greatly disturb the patient's visual judgments, and weak ones are much more apt to be kindly tolerated and to accomplish their purpose. In the author's practice, vertical prisms for permanent use have produced a favorable outcome in two hundred and ninety-seven of three hundred and seventy-six cases.

Of the seventy-four cases that showed no improvement, thirty came to operation, which in every case was tenotomy of the superior rectus, combined in five with advancement of the inferior rectus of the same eye. Of these thirty, four showed no improvement and one was made much worse by operation.

To sum up, we may say that muscular anomalies are today recognized as deserving of notice in routine ophthalmic work, and as civilization imposes more stress upon the visual apparatus, they will have to be reckoned with.

Esophoria is quite amenable to the kindly influence of a good refractive correction. Exercises are sometimes required, permanent prisms quite infrequently, and operation almost not at all.

Exophoria is much more assertive; not so amenable to refractive correction alone, generally requires training, to which it is disposed to respond readily; will often require permanent prisms, and sometimes operation.

Hyperphoria seems almost independent of refractive status, does not respond well to training, very frequently demands prisms, and a little oftener than exophoria, will call for operation.

W. R. P.

Treatment of Trichiasis.

BUTLER, HARRISON T. (*Ophthalmoscope*, November, 1914). The paper deals with the methods of treating trichiasis employed by the writer after four years' work at the British Ophthalmic Hospital in Jerusalem.

Trichiasis may be caused by entropion or by a growth of adventitious lashes in a false position—the so-called “distichiasis”—or by a combination of both causes. It may be present in any degree of severity. In severe cases all the lashes may sweep the globe, and in advanced trachoma the palpebral slit may be contracted by conjunctival atrophy and distortion of the tarsus until the eye is almost immobile. Trichiasis is caused by trachoma, by chronic blepharitis, and by spasms of the orbicularis.

Trichiasis operations naturally fall into two groups: Those in which the tarsus is split from the edge, and those in which it is divided transversely. There is a third group of operations applicable only to trichiasis localized at the canthi.

From the performance of over a thousand operations for trichiasis the following were selected as meeting all cases: Van Millingan's, Snellen's, a modified Spencer-Watson, and simple excision with a lip graft.

Of the splitting operations, van Millingan's was found to be the only satisfactory method, and the Jaesche-Arlt and combination of the Arlt and Holtz methods were abandoned, after being thoroughly tried out.

The operation is performed in the following manner: After the usual preparation, a Snellen clamp is inserted backwards and the lid everted. The lid is now carefully split from end to end of the clamp, the clamp is removed, and the split continued upwards and inwards into the skin surface at each canthus. It may be carried one to two millimeters into the skin, and deepened seven millimeters. It is essential that the split shall be long and deep, so that it loses its tendency to close, and gapes naturally. If the trichiasis extends to the canthi, the split should be carried well into the skin at each end. Any vessel seen to be spouting should be twisted. The

clamp is now inserted in its natural position, and a piece of skin removed from the lid, exactly as in the Arlt operation. Its breadth will depend upon the amount of loose skin in the lid. In many cases it is unnecessary to remove any at all. The skin wound is now sewn up and the clamp removed. As soon as the bleeding from the split tarsus has ceased, the inner lip of the wound should be carefully examined with a lens to detect hair follicles. Should any be found, they must be excised with scissors. If any roots are left behind, they will grow and appear between the inner lip and the graft in a very undesirable position. The patient should be well under the anesthetic. A pad of wet wool is placed under the lower lip, which is everted, and compressed at each end between the fingers and thumbs of the assistant. With a sharp knife a graft 2.5 millimeters broad and as long as the split is marked out and detached with a pair of sharp scissors. While the assistant sews up the lip wound the graft is spread on the back of the hand and the submucous tissue removed with curved scissors. If there is no bleeding from the wound it is gently scraped, to provoke a little hemorrhage, and the graft adjusted in place. It should be gently pressed until the blood has coagulated under it and has luted it down. Should there be trichiasis at the canthi, the graft must be large enough to enter the skin. As soon as all hemorrhage has ceased the graft is gently wiped clear of bloodclot and the eye irrigated with boric lotion or normal saline. The lower lid must now be well greased with boric vaselin, to prevent any possibility of the graft adhering to it. A piece of well-greased oil silk is used as a dressing, which should be removed after forty-eight hours.

The chief operations in which the tarsus is divided transversely are Snellen's, Panas', and Burow's. Panas' operation, although efficient, caused much ugly thickening, and in cases where there is much atrophy the lash bearing fragment is liable to slough. Burow's operation is liable to an early relapse. The tarsus is divided from the inside, and the contraction of the cicatricial tissue formed draws the lashes inwards.

Cant's modification of Snellen's operation gives excellent results in selected cases, and the cosmetic effect is good. The tarsus must be of good breadth, the operation must on no ac-

count be repeated, and there must be no conjunctival atrophy. If the trichiasis extends to the canthi, the operation must be combined with the canthoplasties at either or both angles.

The objections to the operation are that a considerable number of cases relapse, and if the tarsus be short, or the operation be repeated, lagophthalmos results. If there be much atrophy, the lower fragment may slough, wholly or partially. A canthoplasty does not seem to render sloughing more frequent.

Cant's modification of Snellen's operation is performed as follows: Snellen's clamp is inserted, and the skin divided from one end of the clamp to the other, close to the lid margin. A second incision is carried through the skin at a height above the first which is gauged by the amount of loose skin in the lid. The piece of skin between the two incisions is removed. It is generally about 3.5 millimeters broad. The skin is reflected upwards, cleansing the tarsus and removing the fibers of the orbicularis. The "cartilage" is now incised from one end of the clamp to the other, close to the roots of the cilia, and the incision is carried down to the conjunctiva. A second incision is made parallel to the first, from one to two millimeters above it. This incision is also carried down to the conjunctiva. The narrow strip of tarsus included between the two incisions is now removed with scissors, leaving a long trough, the floor of which is formed by the conjunctiva.

The lower cilia-bearing fragment is now sutured to the tarsus above the trough, as in Hotz's operation, by four sutures. These sutures may or may not include the skin. When the sutures are tied after removing the clamp, the cilia will all be everted. In very slight cases the piece of tarsus removed may be a mere shaving, or one incision may suffice.

Van Millingan's and Cant's operations are applicable to most cases of trichiasis. For slight cases Cant's is the better. It takes a shorter time, the cosmetic effect is certain, and it is a much less formidable operation. On the other hand, it weakens the tarsus and shortens it. The trachoma also tends to shorten the tarsus. In severe cases, or where the trachoma is still progressing, it should not be done. Van Millingan's operation, on the contrary, lengthens the conjunctiva, which is being shortened by the disease; it removes nothing, and so it can be applied to all cases. Cant's operation is very prone

to result in recurrences, while the writer has never seen a recurrence from van Millingan's.

General anesthesia with ether, inducing with gas or ethyl chlorid, is always used. H. R. P.

The Treatment of Trachoma by CO₂ Snow.

HARSTON, C. MONTAGU (*Ophthalmoscope*, November, 1914). Trachoma is considered cured when the following conditions are complied with:

1. Absence of discharge of any kind, whether purulent, seropurulent, serous, or lacrimal.

2. A smooth appearance of the palpebral conjunctiva, and an absence of hypertrophy in the conjunctiva of the fornices.

3. The reduction of pannus to a minimum, as revealed by the presence of old involuted vessels in the superficial layers of corneal epithelium, if Bowman's membrane has remained intact; and by the presence of old opacities, if Bowman's membrane has been destroyed in parts and the superficial layers of the substantia propria have been involved in the trachomatous process.

4. The absence of any gross deformity of the lids, such as entropion.

With the exception of the last condition, all these may be obtained by the use of solid carbon dioxid for thirty seconds once in ten to fourteen days in the course of three months, in a chronic, and in the course of six months in a recent, case.

Over seven thousand cases have been treated in China with successful results. It has proved to be the most rapid method of cure when employed in conjunction with other recognized methods, such as the maintenance of cleanliness, "expression," when needed, with Knapp's roller forceps, the treatment of pannus by means of X-rays, and the treatment of entropion by Snellen's operation.

Method of Procedure.—The snow is collected in a Prana cage and rammed down tightly into a cylindrical mould; if preferred, a specially shaped mould may be used, so that the stick of snow may be shaped to fit the everted lids. Harston generally prefers, however, to sharpen the cylindrical stick to a pencil point. The surgeon stands behind the patient and everts the lids in the ordinary manner. In Europeans he instills cocain and adrenalin before applying the snow, but

Chinese stand the application well without an anesthetic. The transitional folds are made to stand out prominently, and the snow pencil is applied horizontally to the everted lids, with very firm pressure, for fifteen seconds at the first application, and for thirty seconds to all subsequent ones. Care must be taken to avoid contact of the snow pencil or the frozen conjunctiva with the cornea. Harston generally runs his forefinger over the everted lids to make sure that no gritty particles are left behind on the conjunctiva. After an interval the lids are replaced. The ensuing pain is infinitesimal when compared with that which follows the application of "bluestone" and other caustics. After two minutes the patient can open his eyelids without any ensuing blepharospasm.

As regards the extensive scarring which is alleged to follow, the author has had none in his experience. He believes that it may be due to too frequent application of the remedy, the snow being applied before all reaction has subsided from the previous application.

"The application of solid carbon dioxid snow induces a chronic hyperemia of the conjunctiva; in fact, we have in this method of treatment a modification of Bier's hyperemic treatment, so useful for other forms of granulomatous disease. The action of the remedy is exactly comparable to the action which follows application of a pressure bandage to the knee in tuberculous disease of that joint, and I attribute the beneficial effects to the chronic hyperemia induced." *W. R. P.*

Ocular Angiosclerosis.

KRESS, GEORGE H. (*Ophthalmoscope*, December, 1914). The paper deals with the various phases of ocular arteriosclerosis.

Vascular sclerosis is closely associated with faults of our civilization, such as overeating, high tension living, alcoholism and syphilis. It is intimately associated with chronic nephritis, as well as with simple old age.

Ocular angiosclerosis, not alone because of its capacity to impair vision, but because the changes of the sclerotic process in the eye are sometimes earlier or more evident than in other parts, may be the means of early diagnosis of general arteriosclerosis and treatment.

Hirschberg found evidence of retinal angiosclerosis in fifty per cent of old persons, coming for refraction, while Hertel

found an even higher percentage in the microscopic examination of the retinal vessels of old people.

Hypertension may be one of the early manifestations or concomitants of vascular sclerosis, and should be routinely determined in all patients past the age of forty as well as in those cases showing increased intraocular tension.

The normal anatomy of the retinal blood vessels.—According to Oatman, in the large central artery of the optic nerve there can be demonstrated an outer (adventitia) of connective tissue; a middle (or media) of elastic and fibrous tissue, interspersed with a few muscle elements; and an inner (or intima) made up of (1) an elastic lamina; (2) a subendothelial layer; and (3) a stratum of endothelial cells. As the central artery appears on the disc, however, and as its branches get farther away therefrom, the above mentioned subendothelial layer and elastic layer of the intima usually give place to a few elastic fibers only.

In the normal central vein, this subendothelial layer and the so-called elastic membrane of the intima are lacking. The retinal veins are, in fact, little more than tubes of fibrous tissue lined by endothelial cells.

Microscopically the morbid anatomy of the sclerosed arteries shows a thickening of the inner coat, either from patch-like areas of endothelial proliferation or from a very considerable addition to the subendothelial connective tissue; the middle coat presents usually areas of necrosis and hyalin and fatty degeneration with formation of atheromatous detritus, which may or may not later on be infiltrated with calcareous material. The outer coat in more advanced cases may also show thickening. The veins likewise show increase of connective tissue in the internal coat, and degenerative changes in the outer layers, with a weakening and widening thereof, or if calcareous deposits be associated, then a stiffening or hardening of the vessel.

As a result of the angiosclerotic changes the eye tunics are supplied by blood vessels with narrowed lumina and bathed with blood containing the toxic elements lying at the root of the sclerosis. Consequently, the nutrition and metabolism of the retinal and other ocular tissues suffers. Associated with the above factors are the weakened vessel walls and their greater tendency to leak and be responsible for hemorrhagic spots in the retina.

Sudden diminution of vision of marked amount does not, however, usually result from angiosclerosis, except when the sclerotic changes occlude the lumen of the central artery or vein; or, with more extensive weakening of the ocular vessels, are responsible for a sudden intraocular hemorrhage.

A weakness in the visual power in persons past forty, which does not respond to suitable refractive correction, should, however, lead to a suspicion of vascular changes, and indicate a close examination of the retinal vessel to see if such changes can be discovered.

Systemic signs of arteriosclerosis should also be sought for.

Among the subjective manifestations of ocular angiosclerosis may be noted early decrease in the power of accommodation, or severe headache persisting after refraction has been corrected at the onset of presbyopia.

Among the objective manifestations are the following:

General—Arcus senilis.

Slow reaction of the pupil.

Hyperemic optic disc of dull red color.

Edema of the retina.

Tendency to corkscrew vessels, seeming increase in the number of smaller retinal vessels, due to dilatation making them visible.

Arteriovenous compression.

Increase in the brightness of the light streak.

Perivasculitis.

Decrease in the color and translucency of the vessel walls.

Arterial pulse.

Narrowing of the arteries.

Optic disc and larger retinal vessels may be surrounded by a grayish haze.

Blood extravasation may occur near the vessels, ranging from dots and short streaks to large areas of hemorrhage.

The changes noted may not only involve veins as well as arteries, but also to a certain extent may be almost limited to the veins.

As to treatment, the very nature of the disease, from the standpoint of causative factors and pathology, necessitates emphasis on the hygiene of living. The life which is indicated to be led by such patients should be one of moderation in work, in eating, in exercise, and in personal habits of life;

with emphasis on elimination by bowels, kidneys, skin and respiratory tracts.

Proper drugs have their place, especially the iodids for their alterative and resorptive effects, while symptomatically the nitrites and sedatives, like the bromids, may be of value. The digitalis and strychnin groups can also be called upon if the heart condition indicates their exhibition. But in any rational therapy, the elimination of the underlying causes of the sclerosis are, of course, of the greatest importance, and in conjunction with the above measures, cannot be too much emphasized.

W. R. P.

On the Treatment of Entropion by Grafting Lip Membrane Into the Inner Surface of the Tarsus.

GIFFORD, H. (*Ophthalmoscope*, December, 1914) (describes his operation for entropion, which he first reported in 1892.

The operation consists of grafting lip membrane into the inner surface of the tarsus. The technic which he follows consists in making an incision through the tarsus from the inner surface, about three millimeters from the free margin. This cut is made to gape by inserting three sutures as follows: The needle is passed through the outer edge of the free margin of the lid, taking a bite rather more than one-sixteenth inch wide, then it is passed through a small fold of the lid skin about three-sixteenths inch farther away from the lid edge. Before the threads are tied, a bit of wet cotton is rolled into a hard cylinder about three centimeters long and five millimeters in diameter. This is slipped between the loose loops of thread and the outer surface of the lid, so that when the threads are tied they press the cylinder against the lid and evert its margin.

Into the tarsal cut thus made to gape, either a Thiersch flap or a strip of lip membrane is introduced, and if a little hemorrhage is started by scratching the sides of the cut here and there (to get fresh fibrinogen) and the graft is carefully pressed into the gap with a moist instrument, it heals, almost invariably, without any retaining sutures.

Thiersch flaps were given up after a year's trial, and since then the lip graft has been used almost exclusively, because, although the skin graft cured the entropion, it remained skin, and the accumulated epidermis on its surface produced a very

slight discomfort, unless it were wiped off once or twice a week.

The writer limits the procedure to the cases with the margin turned in extra far. For the ordinary case of trichiasis he generally uses a modification of the van Millingan operation, putting a lip graft into the split lid margin. *W. R. P.*

Two Cases of Acute Retrobulbar Neuritis, Associated With Marked Acetonuria.

FRANCIS, LEE M. (*Jour. A. M. A.*, July 4, 1914). reports two cases which are of interest chiefly because a "thorough physical examination by competent observers revealed no definite findings except the presence of a pronounced reaction for acetone in the urine." Both patients were young—one a girl of eight and one-half years, the other a man of thirty-one years. The histories are given in detail. In the case of the child, the acetone reaction disappeared under a regulation of the diet, and the optic neuritis cleared up. In the second case, a man of thirty-one years, there were marked symptoms of intestinal indigestion and a history of previous attacks of mucous colitis. Regulation of his diet was followed by the same good results. *E. S. T.*

Tumors of the Optic Nerve.

BYERS, W. GORDON M. (*Jour. A. M. A.*, July 4, 1914). Tumors of the optic nerve, growing within its dural sheath, can be divided into two main groups. In the first one, the basis is essentially an overgrowth of the fibrous connective tissues of the nerve. In the second group, the various changes are attributed to the proliferation of the local endothelial cells. Two cases are reported. One, a woman, aged forty-four years, presented herself for blurring of the vision of the right eye. The ophthalmoscope showed no changes, but the vision was reduced to fingers at one foot. The diagnosis, which was uncertain at first, became, five months later, clearly one of tumor of the optic nerve, when slight proptosis appeared along with the beginning pallor of the optic disc. The growth was removed by Kroenlin's operation, and recovery was uneventful and for the past year there has been no recurrence. The growth proved to be an endothelioma. The second patient, also a woman, first showed signs of tumor of the optic nerve in 1907. On account of disturbances in her general health,

she was not operated on until 1914. The growth proved to belong to the connective tissue group, previously mentioned. The operation consisted of division of the external rectus and opening of the conjunctiva and Tenon's capsule for a short distance above and below, and removal of the growth by means of a stout tonsillar snare. The author thinks that this latter operation (Knapp's method of procedure) is more suitable for a large sized growth. E. S. T.

Chronic Ocular Tuberculosis. Necropsy Findings in a Case in Which Death Was Due to Tuberculosis of the Hypophysis Cerebri.

VERHOEFF, F. H. (*Jour. A. M. A.*, July 4, 1914). Ocular tuberculosis may be classified into at least two well-defined types—the acute and the chronic. To the acute type belong the cases of solitary tubercle of the eye, diffuse tuberculosis of the choroid, acute tuberculous iritis, etc. These cases run a relatively rapid and malignant course and result from direct blood metastases. To the chronic type belong the far more frequent cases of tuberculous scleritis, keratitis, chronic iritis, and cyclitis. These run an extremely slow course, are almost never fatal, and healing ultimately occurs, followed frequently by recurrences.

In the case reported, both eyes were obtained for examination and a general autopsy was performed. It seems to be only the third case yet recorded of death due to tuberculosis of the hypophysis cerebri. The case was a married woman, aged thirty-six years. She was first admitted to the hospital January 18, 1912, for a tuberculin test. The right eye became affected with keratitis three years before her death. This subsided after one year, leaving the vision much reduced. The left eye then became similarly affected, and soon the right eye again became inflamed, after which neither eye was entirely free from inflammation. The general condition of the patient was good until the year of her death. Tuberculin tests made four months before her death gave no definite focal or general reactions, the highest temperature reached being 99.4°. This, however, was about two degrees above the usual temperature, which was persistently low. The anterior cervical lymph glands were slightly enlarged. She died during coma, May 29, 1913. Examination disclosed obliteration of the

right pleural cavity by old adhesions extending from the base to the lower lobe. Three nodules were found in the lower lobe. The autopsy findings are given in detail, but the general point of interest is the great enlargement of the hypophysis cerebri, which was about ten times the normal volume. The base of the right lung showed typical picture of tuberculosis under the microscope, as did the hypophysis. In the right eye a large tubercle was found involving the posterior layers of the cornea near the filtration angle. There was some old infiltrations of the sclera, and diffuse infiltration of the iris. Similar changes were found in the left eye. Bacteriologic findings were negative, but in spite of this fact and the inconclusive tuberculin test, the author considers that the lesions in the lung, hypophysis and eyes were typical, mutually corroborative, and incapable of any other interpretation. The author gives a résumé of eight cases of tuberculosis of the hypophysis, from the literature, in none of which was there any ocular involvement.

E. S. T.

Ocular Manifestations of the Toxemia of Pregnancy.

HOLDEN, WARD A. (*Jour. A. M. A.*, July 4, 1914), reports a case of a woman, aged twenty-five years, who was admitted to the Sloane Hospital for Women, February 3, 1913. She was at that time about seven months pregnant, for the second time, and had vomited during the first three months of her pregnancy. For the past month her feet had been swollen at night. For five days she had seen double. There was slight edema, the blood pressure was one hundred and sixty millimeters, and the urine contained twenty per cent of albumin. On February 6th the eyes were examined and a paresis of the left external rectus was found, and an absolute central scotoma in each eye. The fundi were normal in appearance except for a trace of retinal edema. The immediate induction of labor was advised, and was performed. She made a rapid recovery, the sight became rapidly better and she was discharged February 22d. March 3d vision had returned completely and was 20/20 in each eye. There was also complete recovery from the external rectus paresis. There was some slight abnormal pigmentation in the macular region, and she complained of night blindness. She was seen at intervals until January 29, 1914. The pigmentary changes had in-

creased, but otherwise there was no change. The author considers the progressive disturbance of the pigment epithelium of the retina is due to the same toxic condition of the blood which caused the paresis of the external rectus muscle and the retrobulbar affection of the optic nerves. The characteristic lesion in eclampsia is a more or less localized edema of the intracranial tissues of sudden onset. Complete transitory blindness with normal fundi is a fairly frequent symptom. The conjecture would be that edema, possibly of the anterior lobes of the brain, but more likely of the meninges and of the periosteum of the optic foramina which is continuous with the dura mater, brought about pressure on each optic nerve near its origin and on one sixth nerve which, as it passes to the sphenoidal fissure, lies very near the optic nerve. It may be that an excess of certain salines in the blood is the cause of the faulty functional activity of the pigment epithelium that produces the night blindness. *E. S. T.*

Research in Ophthalmology, and the Training of Ophthalmologists.

TODD, FRANK C. (*Jour. A. M. A.*, July 4, 1914). This article, being the chairman's address before the Section on Ophthalmology, covers a rather wide field, and can hardly be sketched in abstract. The work of the section is reviewed in detail. Especial stress is laid on the systematic education of ophthalmologists. The author concludes as follows:

"At present, physicians desiring to take up ophthalmology as a specialty can look to no systematic course. Too many undertake special work after having taken a very short course in some postgraduate medical school, and thus become incompetent and unsafe practitioners. Others sincerely desiring to prepare themselves properly and spend sufficient time, are often unable to outline their own course properly, and find none prepared for them. Such men usually prepare themselves clinically, but do not secure the proper laboratory training, or sufficient training in subjects correlated to ophthalmology. The course should be carefully systematized and arranged to prepare a student properly in the fundamental laboratory and clinical branches related to ophthalmology. An effort should be made to discover among such students natural research workers, and facilities and encouragement should be offered to promote research work. The natural and already

prepared place for such courses exists in high grade medical schools having proper facilities for such instruction. The entire course may be taken in such a university if sufficient clinical material is to be had, or it may be supplemented by an internship in an eye hospital. An exchange of students between universities offering such courses for a short period of time could be arranged with benefit to the students. Degrees should be granted on the completion of thorough and satisfactory work. The requirements and the nature of the degree should be uniform in all colleges granting the degree."

E. S. T.

The Influence of Hookworm Disease on the Eyes.

JERVEY, J. W. (*Jour. A. M. A.*, July 11, 1914), quotes extensively from the recent literature of this condition, and reports the eye symptoms in fifty-three hookworm patients. His conclusions are that the anemia in the disease is a causative factor in the various eye lesions which have been described as accompanying it. None of the eye lesions are in any sense sufficiently distinctive or characteristic to be of diagnostic value.

E. S. T.

Sclerocorneal Trephining for Glaucoma.

PARKER, WALTER R. (*Jour. A. M. A.*, July 18, 1914). This paper comprises a report of seventy-six operations done by Col. Elliot during his recent visit to the United States; and also a report of twenty-seven cases operated on by the author. The results are tabulated, and are excellent. The author concludes that the average results obtained from the sclerocorneal trephining operations for relieving glaucoma are better in the noninflammatory type than in the other forms of the disease. The results obtained when the operation was associated with a complete coloboma were better, as regards both the frequency of the occurrence of iritis and the effects on the tension, than when performed with a partial iridectomy or when the iris was left intact. The remote results may not be so good as those shown immediately after the operation. The number of cases here recorded is not sufficiently large to permit of definite conclusions concerning the real value of the sclerocorneal trephining operation in relieving glaucoma.

E. S. T.

Hereditary Glaucoma (Simplex).

CALHOUN, F. PHINIZY (*Jour. A. M. A.*, July 18, 1914). Heredity is recognized as a common factor in the causation of glaucoma, both of the inflammatory and noninflammatory type. As an hereditary type glaucoma simplex is exceptionally rare beyond the second generation. The author has been able to find recorded only four other families besides the one reported. In his family, one of the first generation had glaucoma; three, or possibly four, out of the five children had the trouble in the second generation; while in the third generation, four, or possibly five, out of the six had it. The details of the case are reported in full. In summarizing the reported cases of hereditary glaucoma, we may say that: 1st, "Anticipation" is the most prominent feature. Hereditary glaucoma usually develops in adults, or at an age far remote from the usual period, and whenever a case is recognized in one under the age of thirty, the hereditary tendency should always be investigated. 2nd, the smallness of the cornea and globe plays an important part, though it is not the sole cause. 3rd, general diseases, other than gout and rheumatism, are a small part in the causation. 4th, the liability to transmission by the two sexes is roughly equal. The male sex shows a greater liability to inheritance.

E. S. T.

The Value of Miotics in Chronic Glaucoma.

POSEY, WILLIAM CAMPBELL (*Jour. A. M. A.*, July 18, 1914). This paper is supplementary to two earlier communications upon this same subject. In the second paper, in 1908, sixty-five cases of simple chronic glaucoma, which had been treated by miotics, were analyzed, of which all but seven had been observed over a period of two years, and twelve for more than ten years, and the results were compared with a similar series of cases treated by iridectomy. It was found that central vision was maintained in the miotic series, each case of which was observed over an average period of five years and eight months, in eighty per cent of the cases, in comparison with twenty-five per cent in the more favorable group of iridectomies.

Of the eighteen cases now reported, one was observed for a period of eighteen years, two for ten years, one for eight

years, one for seven years, seven for six years, one for five years, two for three years, two for two years, and one for one year. The figures obtained by the analysis of these cases agree in large measure with those published in 1908. As it was pointed out at that time, just as the advocates of operative measures find beginning cases to be more amenable to treatment than those in the more advanced stages of the disease, so cases treated by miotics from the early stages give better percentages so far as the maintenance of central and peripheral vision is concerned. The author urges the use of miotics, not claiming them in any sense as curative, but taking under consideration the risks and the bad results which have attended the operation if iridectomy in cases of this class. He lays stress upon the point that miotics should be relied upon as the sole means of treatment only in those cases which are free from attacks from so-called glaucomatous congestion. To gain the full benefit of miotics, it is necessary that they should be administered properly. Beginning in doses small enough to avoid creating spasm of the ciliary muscle, and rapidly increasing the dose until the pupil of the affected eye is strongly contracted; this degree of contraction should be maintained as long as life lasts by gradually increasing the strength of the solution from time to time and by instillation of the drug at intervals of either three or four hours. Gentle massage of the eyeball is of decided advantage. All other factors bearing on the condition should receive careful attention. Proper lenses should be adjusted, and the general health should be looked after. The details of fifteen cases are given.

E. S. T.

Late Infection Following a Trephining for Glaucoma.

BROWN, E. V. L. (*Jour. A. M. A.*, July 18, 1914). Just a year ago Wagenmann reported the first case of late infection following a sclerectomy operation for glaucoma. Since that time twenty-five observers have added thirty-eight cases, and Herbert says that the growing numbers of late septic infections in Europe is causing much concern. Gifford has published the record of one case in this country, and the author now adds a second. The patient was fifty-six years old, and after some preliminary treatment a trephine of the right scleral limbus was done with conjunctival flap and basal iridectomy.

Recovery was uneventful. The patient returned twelve weeks after the operation with the statement that three days before the right eye had suddenly become red and painful and the upper lid swollen and the vision foggy. The week before, the patient had an acute cold. The site of the operation showed a yellowish slightly elevated area. The coloboma and pupillary spaces were filled with a cloudy exudate. Hypopyon was present. Under treatment the uveitis got well in seven weeks, but a moderate increase of tension (40 mm. Hg.) supervened and vision decreased from 8/10 to 3/10. E. S. T.

Lead Poisoning With Paralysis of the External Ocular Muscles.

WILLIAMS, EDWARD MERCUR (*Jour. A. M. A.*, August 1, 1914). Paralysis of the external ocular muscles is a condition very rare in lead poisoning. The author has seen only one other case. The present case, a woman, aged thirty-six years, typesetter, had an acute attack resembling rheumatism, with severe pains in the arms and legs, with paralysis of the right external rectus. The blood examination did not show any basophilic degeneration, nor was the blue line on the gums present. The outcome of the case is not stated. E. S. T.

Enucleation With Transplantation of Fat Into the Orbit.

STIEREN, EDWARD (*Jour. A. M. A.*, August 15, 1914), has operated on sixty-six cases during the last two and one-half years. In the last twenty-six cases he has departed from the usual technic as originally proposed by Barraquer, since with it he noticed too frequently a shrinkage of the cushion from absorption of the fat. He considered that the old technic which required the fat to be enclosed within Tenon's capsule provided for entirely too little fat, and also that the fat was not favorably placed to secure the best nourishment. At present he divides the conjunctiva close to the limbus, dissecting it and Tenon's capsule back as far as possible. A hook is then introduced under the superior rectus, which is held by an assistant while a double armed No. 00 twenty-day chromic catgut suture is passed through the muscle from below upward and tied. The suture is then passed through the conjunctiva directly over the muscle. The other muscles are similarly treated. The eyeball is then forced out of the socket and the optic nerve severed. A piece of fat including the

subcutaneous tissue is then taken from the abdomen about the size of the enucleated eye. This is introduced into the orbit with the subcutaneous tissue upward, so as to provide for union between it and the edges of the severed ocular muscles and conjunctiva. The sutures are then tied. There will result a certain amount of absorption of the fat, varying from one-third to one-fourth of its bulk, but this usually ceases within six weeks after the operation, leaving a soft cushion on which the ordinary Snellen eye rests comfortably and moves with the sound eye. *E. S. T.*

The Etiology of Phlyctenular Ophthalmia.

THEOBALD, SAMUEL (*Jour. A. M. A.*, August 15, 1914), discusses the arguments which have been brought forward to show that tuberculosis is a factor in this disease, and quotes from several of the latest papers on the subject. He concludes that the evidence adduced in support of the doctrine that phlyctenular ophthalmia is a tuberculous or pseudo-tuberculous lesion is far from convincing.

The frequency with which the subjects of phlyctenulosis give a positive reaction to diagnostic tuberculin tests is of little significance, in view of the fact that the same tests show a scarcely smaller percentage of positive reactions in healthy persons.

There is excellent authority for the contention that "until some responsible observer has demonstrated the presence of the tubercle bacillus in an extended series of phlyctenules," or, at least, until it has been shown to be sometimes present, the assertion that the affection is, in any sense, tuberculous is without warrant.

In the present state of our knowledge of the etiology of phlyctenulosis, the employment of tuberculin as a therapeutic agent in this affection is unjustifiable, not only because the ill-considered use of tuberculin is capable of doing much harm, but also because the clinical evidence shows pretty clearly that, if it is not actually harmful, it surely is not helpful. Definite clinical signs of the existence of tuberculosis, apart from the ocular inflammation, may justify the administration of tuberculin, but even in such circumstances the effect on the eye could be only indirect.

As phlyctenulosis is essentially a disease of childhood, and

the typical cases occur not in adult life, but in children, it is from the study of these cases that trustworthy conclusions as to etiology of the affection are to be drawn. The study of these childhood cases shows, from the almost constant association of facial eczema with the ocular inflammation, that phlyctenular ophthalmia, as was formerly very generally held, is an ocular eczema, due, for the most part, like the facial eczema, to intestinal intoxication, and that tuberculosis is seldom, if ever, an etiologic factor. E. S. T.

**A Study of the Effect on Heterophoria of the Correction of
Ametropia.**

ZENTMAYER, WILLIAM (*Jour. A. M. A.*, August 15, 1914). This paper represents a very careful study of about five hundred cases of refractive error with various degrees and kinds of heterophoria.

On the whole, it cannot be said that the correction of ametropia greatly influences the associated heterophoria, some of the change here noted being the result of the natural progress of such associated conditions, as evidenced by the fact that a study of a series in which but two weeks intervened between the tests before and after the ametropia had been corrected showed even less change. In a short series of H + Ah with esophoria for distance, exophoria first test 1.37° , final test 1.25° ; exophoria for near, first test 6.5° , final test 6.5° .

Considering only the heterophoria, it may be said that the correction of the ametropia reduces the esophoria for distance when associated with H + Ah, and tends to increase the exophoria for near.

When esophoria exists both for distance and near, the heterophoria at both distances will be reduced and the esophoria for near may be converted into an exophoria. Esophoria for distance and likewise an exophoria for near will be reduced by the correction of M + Am.

Exophoria for distance and near will be practically unchanged by the correction of a coexisting M + Am.

Esophoria for distance will be little changed or may go over into an exophoria by the correction of an associated Amh. An exophoria for near, under like conditions, will be increased.

Exophoria for distance in anisometropia will be decreased by the correction of the ametropia.

In no group of cases did the average abduction exceed 7° ; the average in all groups was 6.5° .

Hyperphoria occurs in less than fifty per cent of cases of ametropia. It is somewhat more frequent in H + Ah. In more than three-fourths of the cases it is less than 1° , and in less than ten per cent it is 2° or more. Right hyperphoria vastly predominates.

E. S. T.

Epithelioma of the Lids.

FISHER, CARL (*Jour. A., M. A.*, August 29, 1914), has been able to study eighty-eight cases of epithelioma primary in the lids and the canthi, or involving them from the skin in the immediate vicinity. These cases were taken from the Mayo clinic at Rochester, Minnesota; all belonging to the basal celled, or what is commonly known as rodent ulcer. These patients were treated chiefly in three ways: By radical excision, excision with actual cautery of the wound, or simply actual cautery. Purely cutaneous growths, if small, were cauterized. Plastic repair of the tissue was done when necessary. Of the thirty-three involving the lids and canthi, seventeen per cent recurred at some time. These recurrences were all on the site of the previous growths and not in glands. When, however, the growth had penetrated the orbit, the percentage of recurrences rose rapidly—eight out of eleven. The majority of cases which recurred at all did so in three or four months. The author considers that operative measures are, in general, the safest means of treatment, especially when the growth is rapid and adherence to periosteum or involvement of the orbit has taken place. In slow growths, and where the patient can be kept under observation, "there seems to be no good reason why radium should not be used." The Roentgen ray cannot be regarded as a dependable agent in the treatment of epithelioma, however useful it may be as a palliative or postoperative measure. The importance of early and radical operation is well emphasized in the statistic data given. Unless the growth is so clearly circumscribed that complete removal without sacrificing the eye is certain, a complete exenteration of the orbit followed by cautery is imperative.

E. S. T.

International Standard for Testing Vision and Standardizing Other Visual Tests.

JACKSON, EDWARD (*Jour. A. M. A.*, August 29, 1914), calls attention to two essential defects in the present test: (1) The different letters when made as uniform as possible are visible from very different distances. This makes them unsuitable for a scientific standard. (2) They can readily be committed to memory by all who are sufficiently familiar with them to make them a convenient test. This lessens their value as a practical test. He considers the test of the incomplete square or the broken ring greatly superior. As was pointed out twenty-five years ago by Landolt, and a few months later independently by the author, if the card on which one or more of these tests are symmetrically placed is simply turned, it becomes impossible for the person tested to know, except by sight, in what direction the incomplete side is placed. *E. S. T.*

Convergence Insufficiency.

DUANE, ALEXANDER (*Jour. A. M. A.*, August 29, 1914). This paper is a very careful study of a very important practical question, written in this well known author's thorough and careful manner. He describes, first, the diagnostic points of pure convergence insufficiency, and describes the method of estimating the convergence near point. The patient's glasses, or in lieu of these a trial frame or spectacle frame, is placed on the patient's nose and is used as a reference plane, which is adjusted so as to be just 11.5 mm. in front of the corneal apex when the eyes are directed straight ahead. The apex of a millimeter rule is placed against the point at which the reference plane crosses the nose, and the rule itself is held perpendicular to the plane, so as to lie strictly in the midline. Along this rule the test object, which consists of a pin with a white head 2 mm. in diameter, or a minute dot on a card, is carried straight toward the patient's nose, the patient all the time being exhorted to converge on it as sharply as he can. The moment the object doubles insuperably, or the moment one of the patient's eyes is seen to diverge, the distance of the object from the reference plane is measured. If to this distance 2.5 cm. be added, the result will be very nearly the true distance of the convergence near point from the intercentral base line.

The next heading takes up the differentiation of convergence insufficiency and divergence excess, mixed and special forms, etiology, symptoms and treatment. The treatment, which is discussed in detail, comes under the following headings:

1. Correction of the refraction.
2. Correction of exciting causes other than refractive errors.
3. Practice in converging on an approximating point and with prisms, base out.
4. Practice with the amblyoscope, stereoscope and bar reading.
5. Practice in the recognition of diplopia with the aid of the red glass, etc.
6. Prisms for constant wear.
7. Operation.

This paper will well repay a careful study, but it is impossible in the brief space of the abstract to give any but the merest outline of its numerous details. E. S. T.

Trefoil or Stellate Keratectomy for Anterior Staphyloma.

ZIEGLER, S. LEWIS (*Jour. A. M. A.*, September 5, 1914). The author's method, which he first used in 1895, consisted of a horizontal incision with a Graefe knife through the base of the staphyloma. One blade of the scissors is then introduced beneath the upper margin of the horizontal incision, a little to the right of the center, and a long vertical incision made. A second converging cut is then made, the same distance to the left of the center, which joins the first at its apex. The two corners of the opposing wound margins are successively grasped with the forceps and a triangular piece excised by scissors from each corner, thus making a three-leaved opening. The wound is then closed by fine silk sutures. A variation of the operation by the use of a corneal punch is described. Three successful cases are reported. E. S. T.

Further Observation on the Hemiopic Pupillary Reaction Obtained With a New Clinical Instrument.

WALKER, CLIFFORD B. (*Jour. A. M. A.*, September 5, 1914). This paper is a further study of the subject along the lines laid down in the paper published in the *Journal* of last year. He describes an instrument, and concludes with:

1. A weak hemiopic pupillary reaction may be masked by the pupillometer light when observed consensually.

2. Light and dark adaptive phenomena, in addition to dispersion light, seriously complicate the hemiopic pupillary reaction.

3. The hemiopic pupillary reaction is definitely present in anterior lesions, when examined by the rotary shutter method.

4. The hemiopic pupillary reaction is also present in cases having every clinical evidence of being purely posterior cases, although necropsy examination is necessary to prove absolutely that there is no involvement of the optic tract or primary ganglion centers.

5. Although it may be concluded from the examination of these cases that the peripheral retina does possess a weak pupillomotor sensitiveness, there is no evidence that the hemiopic pupillary reaction has any topical diagnostic value.

E. S. T.

Safe and Speedy Extraction of the Immature Cataractous Lens Following Preliminary Capsulotomy.

SMITH, HOMER E. (*Jour. A. M. A.*, September 5, 1914). describes in detail his method of dividing the capsule six hours before the extraction of the cataract, and contends that:

1. An ample, properly executed preliminary capsulotomy has, in mature cataracts, many advantages over immediate capsulotomy or capsulectomy.

2. In Morgagnian cataract it enables one to make what is difficult otherwise, namely, an efficient opening in the capsule.

3. The extraction of the clear lens in high myopia is feasible by this method; and

4. It will render immature cataract operable after a six-hour interval, leading up to a clean extraction.

E. S. T.

The Treatment of Tabetic Optic Atrophy With Intraspinal Injections of Salvarsanized Serum.

JOHNSON, GEORGE T., BREAKES, L. Z., AND KNOEFEL, AUGUST F. (*Jour. A. M. A.*, September 5, 1914). The authors have followed the technic of Swift and Ellis. At first the blood was allowed to stand over night to separate the serum, but later separation was effected by the centrifuge. The neo-salvarsan was dissolved in about ten cubic centimeters of

resterilized freshly distilled water in a glass syringe and the blood was aspirated under forty millimeters negative pressure into a two-ounce skimmed milk bottle of a Babcock tester, so that there was comparatively little exposure of either to the air. All injections were made in the office.

Two cases are reported, in one of which the vision improved from 20/70 right and 20/200 left to 20/50 right and 20/100 left. The other, the vision improved in the left eye from 20/100 to 20/30. The right eye had no light perception.

E. S. T.

Experimental Researches in Methyl Alcohol Inhalation.

TYSON, H. H., AND SCHOENBERG, M. J. (*Jour. A. M. A.*, September 12, 1914). The authors have performed a number of experiments with dogs and rabbits, and give the data of these experiments in detail, with blood count and microscopic findings. The microscopic findings indicated an edema of the tissues with very early signs of beginning degeneration of the ganglion cell layer of the retina. The authors lay stress upon the danger to workmen from inhalation of methyl alcohol, and recommend the use of specially denatured alcohol. They advise vigorous eliminant treatment with stimulating diuretics, ammonia and oxygen inhalation, with sodium iodid and alkalin waters.

E. S. T.

Discussion of the Hygiene of Reading and Near Vision. (Opening Paper.)

PARSONS, J. HERBERT (*British Medical Journal*, August 22, 1914), first considers the hygiene of reading, and sketches briefly the development of writing from ancient times. He discusses the characteristics of the ordinary Roman printed characters, and considers that the spacing of letters and words has a considerable effect upon legibility. A line of print is read in a series of small jumps. At each pause a group of about ten letters is more or less accurately visualized. Attention is directed chiefly to the commencement of words, and words are not read by letters but by their general configuration. Griffing and Frantz in New York showed, in 1896, that print 1 8/10 mm. in height can be read quicker than when it is only half that height. Weber found that an average of sixty letters in one hundred millimeters gave the best

results. The effect of illumination on visual acuity and legibility has been studied by many people. The minimum illumination of the types which permits of normal visual acuity with Snellen's test is two to three meter candles. Vision improves as the illumination is increased up to ten meter candles, after which it remains almost constant up to thirty meter candles and over. A glaring light in the field of vision has less effect than might be thought, but there is no doubt that it is distressing and should be avoided. *E. S. T.*

The Teaching of Ophthalmology.

RAMSAY, A. MAITLAND (*British Medical Journal*, August 22, 1914). The author's remarks are based mainly on the attitude of the Scottish medical schools to the teaching of ophthalmology. This subject is not required in the final examinations, which is to be deprecated. The present medical curriculum is already so overcrowded that the student has not opportunity to give much attention to subjects not included in the final examinations. The teaching should follow two distinct lines for the undergraduate and the postgraduate students. For the undergraduate, fifty hours during one of the three terms are necessary, and the course should aim at qualifying him for the treatment of the commoner superficial diseases of the eye and the recognition of the more serious condition, in order to promptly send them to the specialist. For the postgraduate course, a graded course is required under the supervision of a professor who has control of a complete hospital unit for treatment of patients, training of students, and prosecution of original research. *E. S. T.*

The Causes of Blindness in Eleven Hundred Children. With Special Reference to the Influence of Venereal Diseases.

HARMON, N. BISHOP (*British Medical Journal*, August 29, 1914), has drawn his statistics from the London schools for the blind, and divides the causes in the cases examined into three main groups:

1. Injury or destruction of the cornea consequent on surface inflammation.
2. Inflammation within the eyeball or optic nerve.
3. Congenital defects of the eyes.

Group 1 contained three hundred and fifty-one children in

which ophthalmia neonatorum gave 24 per cent, purulent conjunctivitis of later years 4.2 per cent, phlyctenular keratitis 3.4 per cent, or total of 31.9 per cent of the whole. Group 2 contains a great variety of diseases, and is arbitrarily divided into inflammations of the anterior half of the eye and of the posterior half. Those affecting the anterior half total 19.8 per cent, of which syphilis accounts for 17.8 per cent. Inflammation of the posterior half accounts for 20.5 per cent, of which about half were definitely syphilitic. Group 3, or congenital defects, accounts for 21.2 per cent, only a small fraction of which were known to be of syphilitic association.

E. S. T.

An Analysis of the Results of the New Sight Tests of the Board of Trade.

EDRIDGE-GREEN, F. W. (*British Medical Journal*, August 29, 1914), tabulates the percentages of failure, since 1894, for the color tests, and states that some cases have been rejected by the Board of Trade which he should not have rejected. It is necessary that the Admiralty should fix a standard of tests at which it is necessary to recognize lights with and without conditions of fog.

E. S. T.

A Case of Late Infection Following Elliot's Operation.

GRIFFITH, A. HILL (*British Medical Journal*, August 29, 1914). The case was a man aged fifty-five years, who had been operated on March 25, 1912, for chronic glaucoma in both eyes. The patient was discharged in a month. Both eyes made a perfect recovery and kept well for two years. On March 11, 1914, he presented himself with purulent iridocyclitis of the left eye. There was no light perception and the eyeball was removed three days later.

E. S. T.

The Factor of Heredity in Myopia.

WILSON, JAMES ALEXANDER (*British Medical Journal*, August 29, 1914), has tabulated fifteen hundred consecutive cases. There are nine hundred and ninety-two females and five hundred and eight males. Among the school children the percentage of females is fifty-nine. At the age of puberty the percentage rises, and it increases from this onward. Late development of myopia is acknowledged, but there is no evi-

dence of the frequency of its occurrence. He concludes that the transmission of myopia does not conform to Mendelian laws. A Mendelian dominant descends from an affected person to an affected person. As is well known, there are many exceptions to this in myopia. When both parents are myopic, then myopia is very prevalent among the offspring; it is less so when only one person is myopic, and still less so when neither parent is affected. E. S. T.

The Choice of a Cataract Operation.

MADDON, ERNEST E. (*British Medical Journal*, August 29, 1914). This paper, which is published in full in the *Ophthalmic Review*, indicates a belief that to vary the character of the operation performed so as to meet the precise needs of the individual in question is preferable to practicing the same operation on all patients alike. The first condition is that of safety, and the safest procedure is to perform a preliminary iridectomy and extract the cataract later. The next safest procedure, the so-called combined extraction, is suitable to cases in which the person's age or calling makes the extra loss of time entailed by the second operation a really serious disadvantage. Simple extraction is a much less safe method. Intracapsular procedure should be reserved for cases in which the cataract is immature, and in which ideal facilities for its performance present themselves. The latter procedure, owing to the fact that the cataracts develop much later in life, as well as from other causes, is less safe among white races than among the East Indians. E. S. T.

A Case of Unilateral Interstitial Keratitis Due to Parotitis.

SHOEMAKER, W. A. (*Am. Jour. of Ophthal.*, Vol. XXXI, No. 2), reports the case of a man, aged thirty-two years, who presented all the signs of interstitial keratitis in one eye, developing one week after mumps. Vision was reduced to hand movements. In one month the eye was well and vision normal. Atropin and dionin, with hot applications locally, and bichlorid of mercury internally, constituted the treatment. The author found only three other cases in literature. [The reviewer could add one mild similar case.] E. C. E.

An Intraocular Sarcoma Coexistent With an Orbital Perithelioma.

ALT, ADOLPH (*Am. Jour. of Ophthal.*, Vol. XXXI, No. 5, 1914), details his studies of an eye which was removed for melanosarcoma of the choroid and for a tumor of the orbit which were coexistent. He thinks that because the orbital tumor must have filled nearly the whole orbit, while the intraocular tumor was comparatively small, the intraocular tumor was, perhaps, of more recent growth. He also doubts that a purely orbital tumor ever penetrated into the eye behind the equator. The foregoing, taken together with the different microscopic appearance of the two tumors and many differences in their histologic appearances, leads him to think it is not unlikely that this is a case of an intraocular tumor and an orbital tumor growing separately until the sclerotic was perforated near the optic nerve entrance, probably by the intraocular tumor, and the two tumors were then joined together.

E. C. E.

Herpes Simplex Affecting the Palpebral and Bulbar Conjunctiva, Simulating Lues.

BROWN, SAMUEL, HORTON (*Am. Jour. of Ophthal.*, Vol. XXXI, No. 5, 1914), reports an uncommon herpetiform condition of the ocular structures. The patient, an Italian girl, thirteen years old, was suffering from what appeared to be acute contagious conjunctivitis of the left eye. Both lids were very much swollen. After a few days the swelling subsided and a careful examination was made, revealing a small ulcer at the lower outer margin of the cornea, several ruptured vesicles on the lower bulbar and palpebral conjunctiva, and one large ruptured bleb, one-half inch long and one-fourth inch wide, on the lower palpebral conjunctiva. The edges at the base of this bleb were indurated. The resemblance to primary luetic lesion was marked, but the Wassermann was negative. The acute symptoms subsided under use of boric acid solution, cold compresses and atropin. The sites of the ruptured vesicles and bleb underwent exuberant granulation, thus prolonging the condition. Brown emphasizes the resemblance of this condition to the primary lesion of syphilis, and suggests that the granulation stage may explain many of the cases of granulation in the conjunctiva that are not trachoma.

E. C. E.

Enucleation in Hemophilia.

GREEN, JOHN (*Am. Jour. of Ophthal.*, September, 1914), enucleated an eye which had contained a foreign body for fifteen years. The operation progressed without incident until the nerve was cut, when a copious hemorrhage pushed the globe in front of the palpebral aperture. In the short time required to cut the shreds of tissue still attached to the globe, the connective tissue of the lids was tightly filled with blood and a fat hernia presented between them. The bleeding was finally stopped and the conjunctiva approximated, but bleeding set up again during the night and was only stopped by two injections of normal serum. Following the operation there was a temporary paralysis of the levator palpebræ superioris.

He suggests that we inquire into each case for enucleation to ascertain if he is a bleeder, so that we may guard against hemorrhage by prophylactic injections of normal serum.

E. C. E.

Removal of an Anteriorly Dislocated Lens With Ewing's Keratome.

GREEN, JOHN (*Am. Jour. of Ophthal.*, September, 1914). Extraction in the ordinary manner is difficult, owing to the tendency of the lens to drop back, and to the danger of losing vitreous.

Ewing used a broad keratome, making his incision in the temporal sclerocorneal margin and passing the blade back of the lens. As the blade was slowly withdrawn, pressure was made with a Daviel spoon on the nasal side of the cornea. Some vitreous was lost. Vision was 20/120.

Green's case was a man who had been struck in left eye and eyebrow by piece of wood. A swollen cataractous lens was seen in the anterior chamber. Tension was raised.

In the operation a double fixation forceps was held by an assistant. The incision was made with Ewing's keratome at the upper sclerocorneal margin, the blade of the instrument being passed into the lens back of the nucleus. When the incision was completed, pressure was made on the lower part of the cornea and the keratome was slowly withdrawn. The nucleus and some cortex was extracted. The iris prolapsed, but receded, leaving the pupil nearly round and black. No vitreous.

One month later the iris was adherent to posterior surface of the cornea, and remains of the anterior capsule were attached to the cornea. Vision with + 10 equaled 1/40.

E. C. E.

Blindness Following Injuries to the Back of the Head.

NEWMARK, L. (*Jour. of Ophthal. and Oto-Laryngology*, Vol. VIII, No. 5, 1914), cites three cases, two from his own practice, of blindness following injury to the back of the head. The first case, of Carnill Hirsch, is that of a child who was run over by an automobile. There was a laceration exposing the bone between the lambdion and external occipital protuberance. There was total amaurosis at first, but within three hours he could perceive large white objects; in four hours more he could count fingers at a short distance, but had a right homonymous hemianopsia. The visual fields gradually extended until the second day, when they were normal. It is supposed that the patient suffered commotio cerebri.

The second case is one reported by Newmark. The patient was struck on the jaw and thrown with great force upon the back of the head. He seemed to be blind for about three weeks, when it was thought he could distinguish hand movements. Nine days later he could read the face of a watch, but his field was very limited. One month and ten days after his accident the patient counted fingers correctly at six feet. It was later discovered that he had amnesic aphasia. A little more than three months after the accident his fields were tested and the diagrams showed small residual fields for white. Some months later the examination was repeated and slight change was found. Tests made some years later showed little change.

The third case, a boy, who fell from a moving vehicle, had a fracture of the clavicle and had a large hematoma at the occiput. He was unconscious for three days and apparently blind for six months. Owing to the patient's youth it has not been possible to make accurate visual tests.

Newmark thinks that a traumatic affection of the occipital lobes is responsible for the blindness in these cases, shock being the cause in the first case, and hemorrhage in the other two. He hopes that these cases may justify members of the profession in giving a comparatively favorable prognosis in similar cases.

E. C. E.

Immature Cataract.

WALTERS, FRANK (*Jour. of Ophthal. and Oto-Laryngology*, September, 1914). The essential factor of maturity of a cataract is sclerosis. The lens is not always sufficiently hard at the time it should be removed, so the ophthalmic surgeon will welcome a method of operation which will insure complete removal of the lens. The method used is that devised by Dr. Homer Smith, and consists of a capsulotomy a few hours before the extraction. Dr. Walters and his colleague, Dr. Park, varied Dr. Smith's technic by doing a preliminary iridectomy in eight of their ten cases. In the other two cases they did an iridectomy at the time of extraction. Dr. Smith does a simple extraction in most of his cases. Dr. Walters uses atropin before and after the operation. The visual results in this series of cases range from 20/40 to 20/30, with 20/40 about the average.

Dr. Walters is very much pleased with the procedure and thinks it will prove of greatest value to patient and surgeon.

E. C. E.

Interstitial Keratitis in Ophthalmic Practice.

SANTOS FERNANDEZ, JUAN (*Ophthalmology*, Vol. X, No. 2), concludes his paper with the following summary:

Interstitial keratitis has been the subject of detailed studies in recent times; the new elements of diagnosis lent themselves to confirm what etiology Hutchinson initiated. In our ophthalmologic practice we have been able to prove that interstitial keratitis is generally of easy diagnosis; of prognosis, very exceptionally serious, and its treatment ought to always have for foundation the mercurials, tonics and reconstituents, iodids, and in certain circumstances salvarsan.

The treatment should not be suspended after the keratitis is cured, to avoid relapses. Even when Wassermann's reaction is negative, if the subject has a degree of anemia, the treatment should be continued until that disappears.

Up to now interstitial keratitis has been considered as an almost exclusive disease of early age, but we more often than other authors have observed it to occur in people from twenty-nine to forty years of age. With the majority we have proved its predominance in the feminine sex. The aspect of the cor-

nea has served us to fix the etiology, and the interstitial keratitis occurring with arthritis has served us to establish syphilis as its cause.

E. C. E.

The Convergence Index as a Measure of the Converging Power.

DUANE, ALEXANDER (*Archives of Ophthalmology*, September, 1914). There are two methods in general use of determining the converging power: one, the ability to overcome prisms base out, and the other the determination of the convergence near point.

The first is inexact and unsatisfactory for various reasons, which the writer gives.

The second method is more reliable. The convergence near point should be measured from the base line connecting the centers of rotation of the two eyes, and may be conveniently indicated by the symbol PcB. PcB may be measured as follows:

The patient's glasses, or the trial frame, is adjusted so that the distance from the corneal apex is just 11.5 mm. The apex of a millimeter rule is placed at the point where the reference plane crosses the nose, and the rule is held perpendicular to the plane. Along this the test object is drawn toward the nose. As soon as the test object doubles insuperably, or one of the eyes diverges, the distance from the reference plane is measured. PcB may be used as an approximate measure of the converging power, but the interpupillary distance should be taken into consideration. Duane goes on to give the methods and rules by which the converging power may be calculated. This article does not lend itself to abstraction and should be read in the original.

G. S. D.

Psammosarcoma of the Orbit in a Girl of Thirteen. Successful Removal With Preservation of the Eyeball and Its Functions.

DE SCHWEINITZ, G. E. (*Archives of Ophthalmology*, September, 1914). The patient, a girl of thirteen years, had noticed a tumor-like mass protruding from the upper and inner part of the left orbit two and one-half years previously. Increase in size took place slowly, and the eyeball was pushed outward and downward; however, without diplopia or loss of vision. The left eyeball was seven millimeters below the

level of the right. The rotations and fundus were normal. A deep dense growth was felt in the upper inner portion of the orbit. Radiograms showed the greater part of the orbital roof pushed upward and somewhat to the right, and this extended as far back as the anterior clinoid processes. The frontal sinuses on the left were obliterated to the median line.

Operation showed a growth two and one-half by two centimeters, enclosed in a bony capsule four millimeters in thickness. When the capsule was opened a small quantity of clear fluid escaped and a mass of tissue, suggesting brain substance in color, was found. The tissue and bony capsule were then removed, and the growth was found to lie outside of the muscle cone. A cavity the size of a small egg was present when the growth was all removed. The eyeball returned almost entirely to its normal position, and the only postoperative complication was a paresis of the superior oblique.

Pathologic examination of the growth showed a psammoma.

The psammomas occur most frequently in the brain and choroid plexus, but are not limited to these tissues. De Schweinitz has not previously seen one in the orbit, nor does he know of a case in the literature. As to its origin in this case, he believes that it sprang from the periosteum, and that the bony capsule was produced as are the layers of bone in sarcomata of the long bones. Up to the present there has been no recurrence.

G. S. D.

A Case of Symmetrical Occlusion of the Pupils by the Development of Cysts and Small Solid Masses From the Uveal Layer of the Iris.

WEEKS, JOHN E. (*Archives of Ophthalmology*, September, 1914). The patient, a female, aged twenty-eight years, showed the following condition: V. R. equaled 20/50. V. L. equaled perception of light.

Each pupil is occluded by small pigmented spherical masses of varying size. The right pupil presents four such masses. A small irregular opening in the pupillary space permits a vision of 20/50. Eye otherwise normal. The left pupil is occluded by several globular masses. The masses in both eyes were diaphanous to transillumination. The fundi could not be seen, but projection was good.

The left eye was first operated on, and a liberal iridectomy

was performed upward. There was no pigment left on the lens capsule. Healing was uneventful.

Twelve days later an iridectomy was also performed on the right eye, and a moderate inflammation followed after three days. The final vision was: R. equaled 20/20. L. equaled 20/20.

Pathologic examination of the tissue excised confirmed the diagnosis of cyst formation in the uveal layer of the iris. There also appeared to be hypertrophy of the iris at the pupillary margin. The condition was regarded as congenital in origin.

A consideration of this condition on the basis of this case and previously reported cases is given. G. S. D.

A New Procedure in Cataract Extraction. A Subconjunctival Flap Method of Capsulotomy.

WANDLESS, HENRY W. (*Archives of Ophthalmology*, September, 1914). The difficulties and incompleteness of the ordinary capsulotomy are dilated upon. To lessen these and to render extraction more easy, Wandless performs capsulotomy as the first step in the operation, by puncturing the anterior chamber subconjunctivally with his curved needle capsulotome and then proceeding to open the capsule. If too much aqueous is lost by this procedure, extraction is postponed six to twelve hours. G. S. D.

Report of a Case of Detachment of the Retina, Occurring in a Case of Neuroretinitis, Restored by Scleral Trephining Operation, Associated With Incision of the Choroid and Retina. No Recurrence After a Period of Eight Months' Time.

PARKER, WALTER R. (*Archives of Ophthalmology*, September, 1914). Patient, a male, forty-six years old, complained of progressive loss of vision in the left eye beginning one year previously. V. R. equaled 6/15; L. equaled 4/60.

Right eye showed fine vitreous opacities. Disc slightly edematous.

Left eye showed many dust-like vitreous opacities. Disc hyperemic, scleral outlines blurred. Retina about the disc swollen and hyperemic. Whole retina edematous. Below the fovea the retina was folded and floated free from the choroid. The detachment extended from about one disc diam-

eter below the disc downward and outward as far as could be seen. The field showed a marked contraction in the superior nasal portion. General examination negative.

A trephine opening was made over the site of the detachment, evacuating the subretinal fluid and a little vitreous. Considerable reaction followed.

Fundus examination three weeks later showed the retina reattached. Vision equaled 6/15. Field practically normal. The operation was performed October 6, 1913, and the detachment has not reappeared.

Two other cases of detachment were treated in the same way, but without incising the retina and choroid. No benefit followed.

G. S. D.

The Tangent Curtain.

DUANE, A. (*Archives of Ophthalmology*, November, 1914), describes his tangent curtain for outlining narrow fields and scotomata and for measuring diplopia. This is a curtain with a front or black side facing the patient, and blank except for the fixation point and red strokes in the periphery marking the different meridians. On the back is drawn a perimetric chart. The curtain is used at sixty inches from the patient for measuring scotomata, and the outlines of the scotomata are marked by thrusting different colored pins into the curtain. For outlining the field of vision and plotting the field of fixation and diplopia, a distance of thirty inches is used. A record of the complete diagram of the field is transferred to a special chart.

Duane has used this apparatus for over eight years, and testifies as to its accuracy, simplicity, thoroughness and the rapidity with which it may be operated.

G. S. D.

Sclerocorneal Trephining for Glaucoma. Complications and Failures in One Hundred Cases.

QUACKENBOSCH, ALEXANDER (*Archives of Ophthalmology*, November, 1914), reports on a series of cases of trephining performed at the Massachusetts Charitable Eye and Ear Infirmary on cases of glaucoma, acute, hemorrhagic, traumatic, congenital and chronic. Operations done under local anesthesia. Instruments used were those of Elliot, Stephenson and Verhoeff. Two millimeters trephine was the one of choice.

In two cases the conjunctiva was buttonholed, but without

ili effect. Quackenboss used curved scissors for dissecting up the conjunctiva.

In one case of absolute glaucoma the entire iris was removed. The eye afterwards had to be enucleated.

Vitreous was lost in three cases, but this in no way interfered with the success of the operation.

A single suture to secure the conjunctival flap is advised.

There are two cases of severe iridocyclitis after an operation for simple chronic glaucoma.

The writer uses atropin only in cases showing signs of inflammation.

One case is reported where five months after operation the tension was only ten millimeters.

Late infection occurred in one case.

The cases that came to enucleation after trephining were of the hemorrhagic type. The writer concludes that the operation is best adapted to cases of simple chronic glaucoma. An iridectomy should be done if possible. G. S. D.

Simple Angioma of the Choroid.

LOVE, J. M. (*Archives of Ophthalmology*, November, 1914). C. H., a male, twenty years old, has never been able to see cut of the left eye. It has always been irritable, and he comes to the hospital with one of his periodic flare-ups.

Examination showed left side of face covered by a purplish nevus.

Right eye normal.

Left eye, tension 35. Lids swollen, cornea hazy. Pupil dilated. Yellowish reflex seen in the fundus. Several staphylomata bulging three to seven millimeters back of the limbus. Left eye enucleated on account of glaucoma.

Pathologic examination shows eyeball twenty-nine millimeters in meridional diameter, twenty-six in vertical. Choroid normal up to about the equator; here it begins to thicken, and this thickening increases up to the posterior pole, where it is three millimeters thick. This mass is limited on its inner surface by a grayish, calcified tissue, about one-fourth millimeter thick. It is of a dirty brown color, and looks porous. This area is made up of large capillary blood vessels separated by a fine connective tissue stroma. Peripheral part of tumor contains larger number of pigment cells in the central part.

In places there is bone formation. Tumor does not invade the sclera.

Diagnosis, angioma.

This is a rare disease. Some twenty-one cases have been described. It probably occurs oftener than this would indicate. Six of the previously reported cases have been associated with nevi of the face.

Angioma of the choroid usually begins in the region of the macula.

In Fehr's case the tumor was described ophthalmoscopically twenty years before the eye was removed, and it was possible to watch it during its growth.

These tumors are differently termed, as simple angiomata and cavernous angiomata.

Love believes that these tumors are simple angiomata.

Since they represent abnormal growth of blood vessels, it would seem as if they must be caused by some abnormal developmental influence, and as they are similar in structure to nevi of the skin, it would follow that the same factor that causes nevus is probably operative in angioma of the choroid.

Nevi of the choroid frequently occur with nevi of the face, which growths follow the distribution of one or more branches of the fifth nerve. This strongly suggests a nervous origin for both tumors. Love believes that the growth is due to a destructive lesion of the vasoconstrictor fibers or a congenital absence of them.

G. S. D.

An Attachment for Taking Light Fields.

DENNIS, DAVID N. (*Archives of Ophthalmology*, November, 1914). An arm carrying a hooded light is attached to a De Zeng electric ophthalmoscope. This is fitted with different sized diaphragms. Colored glasses may be slipped over these.

G. S. D.

An Easy Method of Enucleation.

FERGUS, FREELAND (*Archives of Ophthalmology*, November, 1914). This is a modification of Arlt's operation. The external rectus is exposed and divided, leaving a small portion of its tendon. This is seized, the eyeball rotated to the inner canthus and the optic nerve severed. After its division, the movement of rotation is continued, and all other tissues as they come into view resected as closely as possible to the

sclera. A gold ball may then be inserted and the muscles sutured. A great advantage of the operation is that no pressure is put upon the eyeball. • G. S. D.

A Case of Extensive Accidental Corneal Splitting.

SNELL, ALBERT C. (*Archives of Ophthalmology*, November, 1914). The patient was struck in the eye by a chip of wood while chopping. He was seen by the writer several hours later. A tag of opaque tissue, 3 mm. wide and 0.5 mm. thick, protruded between the lids. This represented a flap of cornea which had been peeled off, and the entire corneal width remained attached at the corneal limbus down and out. It was replaced and held in position with a single silk suture. There was a small perforation in the cornea upward. The corneal flap healed in position, but an opaque area remained in its center. A cilium which had been driven into the anterior chamber was allowed to remain, without reaction. The upper part of the lens became cataractous. Vision, 20/200. G. S. D.

A Self-Supporting Eye Clinic for Working People. Report of the First Year of an Experiment at the Boston Dispensary.

DAVIS, MICHAEL M., JR., AND HARTSHORN, EDWARD (*Archives of Ophthalmology*, November, 1914). Those who are interested in the development of medical service, to the end that all classes in the community shall be provided for efficiently and without abuse of charity, should read this very interesting experiment undertaken at the Boston Dispensary.

The self-supporting evening clinic fills a long felt need and deserves to be widely copied by other institutions.

G. S. D.

Samoan Conjunctivitis.

ELY, C. F. (*The Ophthalmic Record*, September, 1914). This is a distinct, acute, infectious disease, with rapid onset, pain, photophobia, high grade conjunctivitis, soon becoming purulent, a tendency to corneal destruction, and the presence in the discharge of a distinct micrococcus. This disease is endemic in the islands and is widely prevalent. It is rare in infants under six months and in the aged. Of one hundred and fifty-seven cases seen by the writer in five months, one hundred and fifty-five were of this nature.

Treatment begun within forty-eight hours after the onset usually produced complete recovery. It is best treated by the silver salts.

The cause appears to be a small micrococcus decolorizing by Gram and growing well on ordinary culture media.

G. S. D.

External Canthotomy.

LAMB, ROBERT SCOTT (*The Ophthalmic Record*, September, 1914). Lamb extols this procedure, especially in corneal ulceration and in gonorrheal conjunctivitis. In the latter disease he performs this operation in all cases at the start. In no subsequent instance has he had to do a canthoplasty.

G. S. D.

The Use of the Snare as the Final Step in the Enucleation of the Eye.

WRIGHT, HAL R. (*The Ophthalmic Record*, September, 1914). Advantages given. It avoids hemorrhage, which is bad for the patient, and which obscures the field of operation.

G. S. D.

A Case of "Squirrel Plague" Conjunctivitis in Man.

VAIL, DERRICK T. (*The Ophthalmic Record*, October, 1914). This article contains a description of "squirrel plague," first observed in California in 1908, and then thought to be identical with the bubonic plague.

In 1911 it was proved, however, that a distinct difference existed between the two, and that squirrel plague was less violent in its manifestations, and due not to the bacillus pestis, but to another organism, then named the bacillus tularensis. Vail reports the following case:

Male, meat cutter, aged twenty-eight years. Ocular inflammation of three days' duration. Left eye presents, externally, the picture of an acute gonorrheal conjunctivitis. Preauricular gland swollen and tender. Palpebral conjunctiva riddled with ten discrete, round, yellow, necrotic ulcers extending down to the tarsus; the largest about one millimeter. Patient continued to grow worse; began to lose weight; temperature, 102°; glands in left side of face and neck swollen, and a pustular eruption appeared on the left temple and cheek. The left lacrimal sac became infected.

He was sent to the hospital and the lacrimal abscess was incised. After a few days he was discharged improved and not seen again.

A bacillus believed to be the bacillus tularense was isolated from the conjunctival ulcers. After the virus had been passed through a series of animals, it was possible to produce multiple areas of necrosis in the palpebral conjunctiva of rabbits and guinea pigs and also swollen glands.

It is believed that the infection came from rotten rabbits sold in the Cincinnati markets, and it transpired that large numbers of dead rabbits were being found in the fields in the vicinity of Cincinnati.

G. S. D.

Treatment of the Earlier Stages of Senile Cataract.

SMITH, LT. COL. HENRY (*The Ophthalmic Record*, October, 1914), believes that the diagnosis of the earlier stage of cataract has not received the amount of attention which it should. The first symptom complained of usually by his patients is failure of distance vision, no complaint being made of the near vision. Distance vision will be reduced to 6/15 or 6/18 before he complains of loss of near vision. With vision not below 6/10, there are seldom opacities in the lens. At 6/12 and below, opacities are present. In cases with vision of 6/10 and higher, there is merely a loss of transparency in the lens. It goes without saying that other pathologic changes must be carefully ruled out.

In the early stages of loss of vision, Smith injects twenty-five minims of a 1 to 6000 solution of cyanid of mercury. The younger the patient the stronger the solution required to produce the standard reaction. Cocain is given locally, and morphin up to half a grain an hour previously. This treatment will within a month bring the patient's vision back to 6/6 or 6/5, and at the end of three months it will be even better.

Smith reports a case of an officer in the Indian army who was blind in one eye and in the other had early cataract without opacities. At the end of three months his vision equaled 6/5. He remained so during three years.

Smith goes on to urge the advantages of extraction in the capsule in immature as well as in mature cataract. The intra-capsular operation can be done as easily without an iridectomy as with one.

Smith hopes that a postgraduate school of ophthalmology may be established in Panjab, since in that area diseases of the eye are most prevalent. G. S. D.

Some Historic Data Concerning Glasses.

HILL, EMORY (*The Ophthalmic Record*, October, 1914). This should be read in the original by those interested.

G. S. D.

Operations on the Extraocular Muscles.

JACKSON, EDWARD (*Ophthalmic Record*, November, 1914), in a thoughtful paper discusses the broad considerations which should be borne in mind by the ophthalmologist before operating on the extraocular muscles. Too little thought is given to combined action of the muscle groups, and each muscle is too often considered as acting alone in a certain movement. As a rule, no ocular movement is produced by a single muscle, and no ocular deviation is kept up by the excessive contraction, or undue relaxation, of a single muscle. Most ocular movements are not in the horizontal plane, and these movements require the combined use of at least three muscles. An operation on any one of the muscles, if it alter the effect produced by contraction of that muscle, alters the general muscular balance.

The relation of the secondary adductors of the eye, the superior and inferior recti, to convergent squint, should be kept in mind. In extreme adduction of the eye, probably more than one-half of the force required to keep the eye turned in is exerted by the secondary adductors. The primary adductor and abductor tend to equilibrium, with the eye at the center of its field of movement. The secondary adductors and abductors tend to draw the eye away from this center.

Tenotomy of either lateral rectus tends to lessen the influence of the primary rotators, and may establish the preponderance of the action of the secondary group. Therein lies the danger of tenotomy, and this danger is lessened, and the desired effect of the operation is increased, by extending the tenotomy to the neighboring portions of the tendons of insertion of the superior and inferior recti.

One reason for the difficulties in correction of vertical deviations by operation is the frequency of a paretic muscle in these cases. A second reason is the intermingling of the

function of elevation and depression with wheel-like rotation. If an elevator or depressor be divided, the muscle must be so reattached to the globe as to counteract the tendency to an overgreat degree of intorsion or extorsion.

If these precepts be borne in mind, many of the failures that we now see after operation on the extraocular muscles will be avoided.

G. S. D.

Heterophorias and Their Treatment.

SAVAGE, G. C. (*The Ophthalmic Record*, November, 1914). Muscle study has been greatly retarded for three reasons:

1. Helmholtz's error in locating the poles of the eye.
2. The teaching that whatever the muscle error, it depends on errors of refraction, the correction of which will cure the muscle abnormality.
3. The unscientific instruments for the detection of muscle errors.

The advantages of the monocular phorometer are described.

Savage discusses the binocular field of vision and the fusion area, and describes the method of determining the comparative tonicity of the two muscles constituting any pair.

The indications for operation in heterophoria are described, the choice given, also the treatment of cyclophoria.

The schematic diagram of the brain centers governing the ocular movements, as conceived by the writer, is reproduced.

G. S. D.

Unanswered Questions Concerning Heterophoria and Heterotropia.

HOWE, LUCIEN (*The Ophthalmic Record*, November, 1914). In the hope that it may stimulate research on heterophoria and heterotropia, Howe indicates some of the important questions still unanswered.

We know that when esotropia has existed for years the internus has been found hypertrophied and the externus atrophied. What is cause and what effect?

We know that the line of principal insertion of a muscle seldom corresponds exactly to the textbook figures. What is the effect of a slight malposition?

What is the importance of secondary insertions of a muscle?

Heterophorias and heterotropias may be studied in institutions for the aged and chronically sick, and exact facts may be found at postmortem.

How best to measure by objective or subjective measures the arc of rotation?

The distinction between active and passive heterophoria and heterotropia?

The relation of the intraocular to the extraocular muscles? As an example of this, the relation of lenticular astigmatism to esophoria and exophoria.

How best to measure excessive accommodation and insufficient accommodation?

Measurement of the fatigue curves of the ocular muscles.

Our diagnosis of muscular anomalies is insufficient. Many questions remain to be solved. As Howe points out, a committee of the Section on Ophthalmology of the American Medical Association now exists, whose special business it is to collect material on this subject and to indicate the lines for future work. This committee is willing and anxious to give assistance to all those taking up these lines of investigation who are not thoroughly familiar with work that has gone before.

[This symposium on heterophoria and heterotropia should be read in the original and should prove of value to the practicing ophthalmologist. The field of ophthalmology is a broad one and taken up by the many other unsolved problems that present themselves, but few are likely to select and do select it for special study and investigation. It behooves the rest not to rush ahead blindly with illadvised and illconsidered treatment and operations, but to follow closely the work of the few and to tread cautiously over unknown ground if they tread at all. The subject still is shrouded in darkness, with an occasional ray of light showing through. It may not be too much to say that a large proportion of the profession knows little concerning the ocular muscles and treats its patients often by rule of thumb.

There are a few who know more, and, best of all, recognize their ignorance and some of the problems to be solved.

It is rather a pity that earnest and thorough students and workers often seem unable to set forth their views in the same language. Especially in this country, it would seem that some uniform nomenclature was desirable.—Reviewer.] G. S. D.

ABSTRACTS FROM GERMAN OPHTHALMIC LITERATURE.

BY

ALBERT C. SAUTTER, M. D.,

PHILADELPHIA.

MAX W. JACOBS, M. D.,

ST. LOUIS.

J. W. CHARLES, M. D.,

ST. LOUIS.

EUGENE J. BRIBACH, M. D.,

ATCHISON.

Physiologic Investigations Concerning the Change of Position of the Globe.

GUTMANN (*Zeitschr. f. Augenh.*, February, 1914). According to Gutmann, the position of the globe is influenced by the shape of the eye, of the orbit and by the orbital contents. It is limited by the aponeurosis cone of Tenon's capsule, the periocular and retrobulbar fat and the posterior surface of the lids. While it may be rotated by the muscles, it is very slightly compressible (*verschiebbar*) into the orbit. The cone is three-fold: the external bony wall, Tenon's capsule and the straight muscles.

The traction backward by the recti is only slightly opposed by the obliques, but most firmly by the tense septum tarso-orbitale and the retrobulbar tissue. He considers the orbital blood vessels an important factor in determining the prominence or yielding under pressure of the globe (*verschiebbarkeit*). His investigations were conducted with reference to the extent to which the eye could be pressed backward "axially" under normal conditions of refraction (or slight hyperopia or myopia) and intraocular pressure. He considers it important

to establish a normal standard for the purpose of comparison in pathologic conditions—e. g., exophthalmus.

The patient is placed upon his back with the eye directed vertically upward. He uses an instrument somewhat similar to the Schiötz tonometer, to which he has given the name of Piezometer (Verschiebarkeitsmesser). Using weights of 15 g., 20 g. and 25 g., he found that the average axial yielding of the globe into the orbit was:

In the child	15 g.....	0.6 to 0.7 mm.
	20 g.....	0.8 mm.
	25 g.....	1.0 to 1.1 mm.
In the adult	15 g.....	0.7 to 0.8 mm.
	20 g.....	1.0 mm.
	25 g.....	1.2 mm.
In the aged	15 g.....	0.1 mm.
	20 g.....	0.2 mm.
	25 g.....	0.3 to 0.5 mm.

There was no difference shown in the two sexes. He does not consider the compressibility of the globe of importance in the examination, because the surrounding tissues are so much softer and more yielding than the coats of the eye.

J. W. C.

Experimental Work on the Origin of Congenital Anomalies and Deformities.

PAGENSTECHER (*Muench. med. Wochenschr.*, March 17, 1914) fed pregnant rabbits with naphthalin three or four times, beginning on the tenth day of fetal development. Fourteen animals were treated and given 2 gm. of naphthalin per kilo of body weight as the first dose. The later doses were smaller. In only four animals were the young brought forth alive or could they be kept alive. The four litters showed partial cataracts, mostly of the typical form—anterior and posterior polar, central spindle type or lens malformations. Similar conditions were found in some fetuses taken alive from the mothers before term. Pagenstecher's findings are in accord with results obtained in a series of similar experiments reported previously by him.

M. W. J.

The Cataractous Degenerative Process of the Lens and Its Production in the Reagent Glass.

HOFFMANN (*Muench. med. Wochenschr.*, March 17, 1914) states that the process of cataract formation can be recognized by the appearance of myelin substance, demonstrable in a variety of ways. Myelin was first recognized fifty years ago, but forgotten until recently. It appears in teased specimens in the form of myelin figures, more rarely as ball-like, lamellated masses or in large patches. It dissolves easily in alcohol, leaving usually a shadowy residue, and is insoluble in acetone. Osmic acid stains it from pale to dark gray. It is very refractory towards other fat stains. After treatment with Müller solution and sudan, a passable picture can be gotten in frozen or paraffin sections. He found the same and only this one cataractous degenerative process in all forms of cataract. The first stage in the process is the appearance of myelin, and this is as far as the anatomic change advances in some cases. In many, however, a variety of changes occur. According to Hoffmann, the appearance of the myelin substance is a specific symptom of the cataractous process.

From our study of general pathology, we know that the more an organ is withdrawn from its normal cycle the more do pathologic processes analogous to autolysis occur. Hoffmann, by means of autolysis, was able to produce changes analogous to the degenerative process seen in cataract. He concludes that the cataractous process is a fermentative affair. The source of the ferment or ferments has been proven to be solely the lens. The ferments must be numbered amongst those autolytic ferments discovered by Salkowski whose incongruence with the defensive ferments of Abderhalden has up to the present remained unproven. We must differentiate sharply from these ferments that principle which makes possible their potency. It can be assumed that it differs with the various forms of cataract.

M. W. J.

Concerning the Etiology of Cataract.

SCHANZ (*Muench med. Woch.*, 1914, No. 34; Abst. in *Woch. f. Ther. u. Hyg. des Auges*, October 1, 1914). The lens consists of colloidal albuminous substances which are acted upon chemically by light rays, especially those of short wave length.

Light transforms the easily soluble albuminous substances into less soluble and finally coagulates them. In lightning cataract this coagulation is effected by the great amount of light rays, not by the catalytic action of electricity. The lesions of the capsular epithelium may be induced solely by light rays.

The action of light in physiologic intensity may result in senile cataract. A portion of the visible and most of the invisible rays are reflected from the posterior surface of the lens with loss of short wave light rays. They are reflected towards the center and anterior capsule, from which they are again reflected into the interior lens substance which absorbs the short rays. Diffusion of light also occurs. By reflection and diffusion the portions of the lens behind the iris are also involved.

The shape of the opacity is dependent upon the inner structure of the lens, its nutrition, the arrangement of its fibers and the condition of the capsular epithelium.

Cataract usually first manifests itself in the lower half of the lens, this portion being particularly exposed to light rich in rays of short wave length. A. C. S.

Effects of the Ultrared Rays on the Eye.

JUERG REICHEN, Arau (*Zeitschr. f. Aug.*, January, 1914). In 1891, Widmark had concentrated the light of an arc lamp on the rabbit's eye by means of a (pebble) crystal ("Berg crystal"). The ultraviolet rays were absorbed by means of a glass plate. Having excluded light rays and ultraviolet rays, he obtained a marked eight-day long miosis, in spite of repeated atropin instillations.

Hertel found that water partially allows ultrared rays to about 2000 microns wave length to pass through. The ultrared wave lengths in the neighborhood of the red penetrate most strongly, following the law of Masson and Jannin that ultrared rays are the more strongly absorbed by transparent bodies the greater their wave lengths. Wave lengths of more than 2000 microns are absorbed at the surface of the ocular media (tears, corneal and conjunctival epithelium or aqueous) and transformed into heat.

Recent investigations of Vogt demonstrated that the short wave ultrared penetrate not only the media, but also the lids,

sclera, retina and choroid. White heat sends off a great quantity—red-glowing or nonglowing heat emits no appreciable amount of eye penetrating ultrared. Vogt found with such relatively long waved ultrared rays in the rabbit's eye marked conjunctival irritation, desquamation of epithelium, and, if applied to the limbus, irritation of the iris and ciliary body. He used a stove plate heated to about 300 degrees (Cent.), at a distance of 10 to 14 cm. for one to two minutes. The pupil changes lasted from a few minutes to half an hour, and only when the region of the limbus and the root of the iris were exposed.

Reichen's task was to produce analogous changes with the relatively short wave ultrared which penetrate the ocular media. He filtered the light from an arc lamp of about 400 M-K. strength through an iodine solution in bisulphid of carbon, and concentrated the filtered light with a salt lens. Visible light and ultraviolet are absorbed, while the glass vessel, or in addition a layer of water, absorbs the long wave ultrared.

His conclusions are that the ultrared rays cause, in the pigmented rabbit's eye, a narrowing of the pupils lasting several hours. Irritation of the conjunctiva and cornea was insignificant. It is indubitable that the short wave ultrared rays which penetrate the media can cause an irritation of the deeper parts of the eye. Vogt has shown that the iris absorbs the most of the ultrared, which explains the pupillary contraction. He found ophthalmoscopically no demonstrable clouding of the lens or change in the retina. *J. W. C.*

Comparative Investigations Concerning the Influence of Massage on the Behavior of India Ink in the Eye.

Musy (*Zeitschr. f. Augenh.*, January and February, 1914) divided his experiments into three series of three albino rabbits each, with normal fundi. In each series he injected a thick sterile suspension of india ink under the conjunctiva; in the second, into the anterior chamber; in the third, into the vitreous. The animals of the first series were killed one hour after injection; of the second, fourteen days; and of the third, four weeks. The left eye was massaged in the first series, once; in the others, every two days, beginning with the second day. The massage was done five minutes with the finger and circularly through the lid.

The first animal (subconjunctival, killed in one hour) showed no great difference in the two eyes; the ink perhaps slightly deeper toward the equator in the massaged left eye.

The second animal (anterior chamber, killed in one hour) showed in the right eye thick ink masses filling the anterior chamber, a continuous layer in the angle, meshes of the iris root, and ciliary body; and granules of ink in the subconjunctival vessels.

The massaged left eye showed, in addition, a deeper penetration in the ciliary body forward to the plexus venosus and to the region of the ora serrata; also considerable amounts in the subconjunctival and episcleral vessels.

In the third animal (vitreous, killed in one hour) the right eye showed one portion of the ink reaching the anterior chamber through the pupil and found in the angle, ciliary body and zonule, the other portion traveling in black streaks toward the optic nerve, where a considerable amount was found around the central artery of the retina. A thin layer reaching to the equator was found in the suprachoroidal space and partly in the region of the large choroidal vessels.

In the massaged left eye the zonule was flooded by a large amount of ink. The lens was almost entirely covered by fine particles. In the anterior chamber and on the iris there was more ink than in the right eye, also in the angle, and especially on the ciliary body. Cross and flat longitudinal sections of episcleral and subconjunctival vessels showed ink partially divided in fine granules or as black thrombus-like masses. There was no ink in the posterior part of the globe or in the suprachoroidea.

Second Series.—The first rabbit (subconjunctival, killed in fourteen days) showed in the right unmassaged eye black masses between the peribulbar connective tissue fibers almost to the posterior pole. The skin of the lid was completely black. There was no ink in the neighborhood of the optic nerve; the left eye (massaged every two days) showed, in addition to the above, the ink more finely distributed and extending to the region of the nerve, but there was none in the nerve. The superficial layers of the sclera contain here and there black granules.

The second rabbit (anterior chamber, killed in fourteen days) showed in the right unmassaged eye very little ink re-

maining, a trace in the angle, a thin layer on the anterior surface of the iris, very little in its stroma. There was a black granular mass of ink in the ciliary body. There was no migration backward. Generally, the ink was inclosed in the leucocytes.

The left massaged eye showed free ink in small quantities in the anterior chamber and angle. The granules, for the most part found in leucocytes, covered the iris and pressed into the stroma. In the region of the *circulus venosus major* and angle there were large collections. In the ciliary body there was much ink, reaching to the *ora serrata*. There was none in the deeper parts of the globe.

In the third rabbit (vitreous, killed in fourteen days), the right unmassaged eye showed on the retina a considerable quantity of ink, as also in the sheaths of the nerve fiber bundles. The zonule was covered. In the shallow anterior chamber there was very little ink remaining. On the iris and in its stroma it was sparse, but in the ciliary body it was present in large quantities. In this rabbit there was a perforation of a corneal staphyloma and escape of the emulsion.

In the left massaged eye there was no ink remaining, nor in the sheaths of the central artery. The anterior chamber contained a few granules. There was very little found on the anterior surface of the iris, but there were large masses in the ciliary body as far as the *ora serrata*, and here and there farther back. While this intact globe contained more ink, its absorption was greater than in the unmassaged right eye. The ink was also included by the leucocytes in both eyes.

Third Series.—The first rabbit (subconjunctival, four weeks) exhibited about the same conditions as No. 1 of the second series. In addition there was ink visible in the *plica semilunaris* of the left massaged eye.

The second rabbit (anterior chamber, four weeks) exhibited in the right unmassaged eye great masses in the angle and ciliary body. From the latter a few granules extended backward between the sclera and the choroid. On the iris and in its stroma there was a considerable quantity of ink inclosed by leucocytes. There was no ink in the optic nerve. There was a cyclitic irritation manifested by a slight round cell infiltration.

The massaged left eye showed almost no ink in the angle.

On the iris there was a thin partially interrupted layer of fine granules, and in its stroma black masses were distributed. In places where on the surface the ink was denser, there was more ink in the stroma. In the ciliary body there were dense ink masses, especially in the region of the vessels. The posterior portions of the globe contained no ink. As a rule, leucocytes inclosed the granules.

The last rabbit (vitreous, four weeks) showed similar results to that of the second series. The right eye contained considerable quantities of ink, especially in the nerve, and also in the suprachoroidal space; the anterior portion, the iris stroma and the ciliary body, only very small quantities.

The massaged left eye contained less ink. Small quantities were found in the optic nerve, while very little remained in the ciliary body and the iris.

In two of the rabbits, Nos. 6 and 10, a very short time after injection, the corneæ clouded as in parenchymatous keratitis, and grew larger from increased intraocular pressure (an artificial glaucoma). The unmassaged right eyes became ectatic and perforated, healing slowly, while the corneæ of the massaged left eyes resumed their normal size with normal tension, and the ink was removed from the globe. *J. W. C.*

Scars After Sclerectomy and Trephining of the Sclera.

BACHSTEZ (*Zeitschr. f. Augenh.*, January, 1914) examined one eye after sclerectoiridectomy and two globes after three Elliot trephinnings.

The first patient died of pneumonia and the eye was obtained fifteen days after a Lagrange operation. There was a triangular defect in the sclera with its hypotenuse toward the ciliary body. From its angle arose a canal which penetrated obliquely the sclera and peripheral innermost corneal lamellæ to the anterior chamber. The canal of Schlemm was not injured. In the canal lay a small piece of the membrane of Descemet. There was no epithelial lining in the defect or canal. The conjunctiva was not elevated, but strongly edematous. The edema was greatest over the posterior portions of the wound and the lip of the corneal wound. The remaining tissue was denser and richer in cells, with pale oval nuclei, which were very few in the more edematous parts. In the

denser portions they were more numerous and stained more intensely. Many of them had a long protoplasmic body. The fibrillary connective tissue between was very sparse. The meshes contained detritus and red corpuscles. Over the outer angle of the defect a brown granular pigment was found; in the angle, a few pigment cells. The ciliary body was uninjured, the chamber angle free. The canal of Schlemm was open. In the ligamentum pectinatum there was a considerable amount of pigment. The choroid and anterior portion of the ciliary muscle was detached from the sclera, and between the lamellæ of the suprachoroidea was a homogeneous substance which stained blue (hematoxylin-eosin). The edge of the defect was entirely filled with fresh scar tissue. The conjunctiva showed new connective tissue.

The second case was an eye enucleated for pain after an Elliot trephining with a small peripheral iridectomy which had been performed by the side of a broad iridectomy made four years previously for reduction of tension in an increasing ectasia of a corneal staphyloma. The trephining was repeated in three weeks and the eye was enucleated two weeks afterwards. The conjunctiva over the first operation was flat and not edematous. The outer portions of the scleral defect were filled in by a firm scar tissue (rich in closely crowded spindle cells) which, extending over the sclera in the region of the defect, gradually became poorer in cells and suddenly ceased with the epithelium in a terrace-like manner. The inner portion of the wound was not cicatrized—only sparse connective tissue cells growing inward with a few pigment cells. Schlemm's canal was obliterated, the cornea was vascular and scarred in the outer layers, Bowman's membrane was absent. The sclera was rich in cells and vessels.

The second wound, thirteen days old, was funnel shaped. The surface of the wound was strongly arched, the space between the epithelium and wound lips filled with a tissue rich in cells. The canal from the defect connected with the chamber and extended outward to the plane of the outer scleral lamellæ. It was partly empty, but in portions filled with a substance staining faintly blue. The outer portions of the wound consisted of numerous meridionally placed cells with spindle nuclei and body. Only a small zone under the epithelium was rich in connective tissue (interstitial) supporting

substance. In the remaining parts this was sparse and edematous. Corresponding to the conjunctiva and the episclera, it extended backward over the sclera and ceased gradually terrace-like ("stufenfoermig"). It enclosed blood, pigment from the iris and round cell infiltration with episclera.

"With the exception of a small canal, there was extensive cicatrization. The tissue was edematous. The conjunctiva was raised. Also there was cicatrix formation from the iris." The chamber angle was obliterated, the canal of Schlemm was not demonstrable.

His case 3 was an Elliot upward with peripheral iridectomy. The patient died of pneumonia. The sixty-day-old wound was filled with scar tissue rich in cells. The conjunctiva showed connective tissue proliferation and was somewhat edematous. In the scar were delicate canals lined with endothelium. There was no demonstrable connection with the chamber. Schlemm's canal was widely opened.

J. W. C.

Multiple Cysts of the Tarsal Conjunctiva.

GROS (*Zeitschr. f. Augenh.*, March, 1914) reports two cases in addition to one by Vossius (Heidelberg Society, 1896). In all three cases the microscopic examination yielded the same picture: corresponding to the elevations, there was a series of large and small cavities, some empty (from the section?), others containing concretions with concentric layers. They lay directly beneath the conjunctival epithelium, occasionally separated from it by a layer of connective tissue. They were lined by a double layer of cylindrical epithelium. A few showed an epithelial projection, similar to a duct, which connected with the conjunctival epithelium. In some portions the cysts were not completed, but consisted of more or less deep dipping-in of conjunctival epithelium. Some terminated in blind pockets, others were branched. Clinically all were accompanied by a conjunctivitis of a year's duration. The author believes that this was the cause: that by the disappearance of the subepithelial tissues, the epithelium was drawn in and then proliferated. Cystic degeneration ensued upon closure of the outlet. Treatment consisted in excision of the larger cysts and in the use of a discission needle on the smaller.

J. W. C.

Ocular Symptoms Following Attempts at Suicide by Strangulation.

HIRSCH (*Prager med. Woch.*, No. 27, 1914; Abst. in *Woch. f. Ther. u. Hyg. des Auges*, August 20, 1914) reports three cases. The characteristic ocular symptoms consisted in an ecchymosis of the lower half of the globe, ending abruptly at the fornix and not involving the plica semilunaris. The ecchymosis may not appear at the exposed portion of the eye for twenty-four to thirty-six hours afterwards. The ecchymosis gradually spreads upward in both eyes until it reaches the horizontal meridian or a little above it. The blood is undoubtedly in Tenon's space, brought about by an extravasation of blood in the basal subdural space. The blood probably reaches Tenon's capsule along the nerve sheaths or the recti muscles.

A. C. S.

Further Contributions Concerning Metastatic Conjunctivitis in Gonorrhea.

DAVIDS (*Graefe's Archiv. f. Ophthal.*, Vol. 87, Part 1, 1914; Abst. in *Woch. f. Ther. u. Hyg. des Auges*, July 16, 1914) claims metastatic conjunctivitis in gonorrheal subjects is usually confined to the male sex, and is frequently associated with other metastatic processes.

The inflammation is generally bilateral, and results in a scanty catarrhal secretion. It is rebellious to treatment and prone to relapse. Clinically it often resembles phlyctenular conjunctivitis, but it may reach a stage resembling the typical picture of gonorrheal conjunctivitis. Gonococci in small numbers have been found in the tissues and secretion.

The author reports a case in which one eye showed metastatic conjunctivitis and the other eye a blennorrhea with many gonococci in the secretion.

A. C. S.

Gonorrheal Keratitis After Injection of Gonococcus Vaccine.

STREBEL (*Muench. med. Woch.*, 1914, No. 26; Abst. in *Woch. f. Ther. u. Hyg. des Auges*, July 30, 1914). In Strebel's case there occurred urethritis with positive gonococcic findings, arthritis and metastatic iridocyclitis, absence of gonococci in the conjunctival sac, gonorrheal skin efflorescences and plantar hyperkeratosis.

The corneal affection originated endogenously, the primary site of the infiltrate being subepithelial. The corneal disease

resembled the endogenous type of gonorrheal conjunctivitis in its variable course. The infiltrates resembled those of scrofulous keratitis, and the swelling at the limbus that observed in eczematous conjunctivitis.

In this case metastatic keratitis occurred twenty-four hours after the injection of ten cubic centimeters of gonococcic vaccine. The exacerbation of the uveitis he considers a local reaction, dependent upon injection of homologous bacterial albumin.

A. C. S.

The Origin of Keratoblasts in the Regeneration of the Cornea.

SALZER (*Muench. med. Woch.*, 1914, No. 27; Abst. in *Woch. f. Ther. u. Hyg. des Auges*, August 20, 1914) claims the keratoblasts originate from the epithelium, basing his conclusions on experiments conducted on rabbits' eyes. These conclusions were corroborated by similar experiments on the guinea pig, chicken, pigeon, trout, frog and triton.

A. C. S.

The Genesis of Interstitial Keratitis.

SCHIECK (*Deutsche med. Woch.*, No. 18, 1914; Abst. in *Woch. f. Ther. u. Hyg. des Auges*, October 8, 1914) attributes interstitial keratitis to local anaphylactic processes due to the action of luetic antibodies upon a dormant luetic antigen within the cornea.

In the cornea of luetic subjects, spirochetes or their albuminous constituents remain as antigen without affecting its transparency, while antibodies are formed in the rest of the organism. The antigen remains in its original form in the cornea on account of its exclusion from ordinary circulatory and metabolic processes. An increase of metabolic activity of the cornea may result in a coalition of antibodies with antigen in an anaphylactic inflammation. The occurrence of the disease in the other eye he ascribes to metabolic changes brought about by nerve irritation, which changes favor a junction of antibody with antigen.

A. C. S.

Contribution to Experimental Sporotrichosis of the Eye.

FISCHER-GALATI (*Græfe's Archiv. f. Ophthal.*, Vol. 87, Part 1, 1914; Abst. in *Woch. f. Ther. u. Hyg. des Auges*, July 16, 1914) publishes the results of his experiments on dogs, cats and white rats. Four types of pathogenic sporotrichia

exist. The cornea may be involved and present a yellowish red tumor formation. An iridocyclitis may be caused by invasion of the blood channels. Injections into the anterior chamber or vitreous are followed in a short time by inflammatory manifestations, eventually resulting in atrophy of the globe. Potassium iodid causes a regression of the clinical signs.

A. C. S.

Concerning Trachoma Verum Corneæ.

PASCHEFF, Sofia (*Græfe's Archiv. f. Ophthal.*, Vol. 87, Part 3; Abst. in *Woch. f. Ther. u. Hyg. des Auges*, July 30, 1914), arrives at the following conclusions:

In addition to pannus fibrosus of vernal catarrh and pannus vasculosus simplex of many acute inflammations of conjunctiva and cornea there occurs a pannus follicularis which differs from follicular conjunctivitis in a concentration of germinating centers and the formation of tumor-like swellings rich in germinating centers. This type he designates trachoma verum corneæ. Histologically it resembles trachoma verum conjunctivæ, consisting of a lymphadenoid hyperplasia of the conjunctiva.

A. C. S.

The Spontaneous Iris Cyst.

TERTSCH (*Græfe's Archiv. f. Ophthal.*, Vol. 88, Part 1, 1914; Abst. in *Woch. f. Ther. u. Hyg. des Auges*, September 17, 1914) mentions three varieties.

The first includes the cystoid transformation of endothelial or epithelial cells implanted in the iris stroma or cystoid dilatation of hollow spaces within the stroma.

The second results from distension of a preformed cystoid space at the posterior surface of the iris.

The third variety includes the intraepithelial cysts located between the two pigment layers of the iris. These can only develop posteriorly into the posterior chamber.

A true dermoid cyst of the iris has as yet never been observed in an eye normally developed. The literature contains fifty-one cases of spontaneous cysts of the iris.

A. C. S.

Scleritis and Podagra.

KALASCHNIKOW (*Centralbl. f. prakt. Augenheilk.*, July, 1913) brings to mind an observation of Panas, who compared the eye to the hip joint, the eyeball corresponding to the caput

femoris and Tenon's capsule to the trochlea. The sclera is attacked by the same diseases which are seen in the joints, and therefore requires the same treatment. Rheumatic affections are relatively commoner in the eye than those of luetic or tubercular origin. Acute rheumatism manifests itself in the eye as hydrarthrosis oculi (an inflammation of Tenon's capsule). Chronic rheumatism, which is rightly called arthritis urica, occurs in the eye as scleritis urica. The proper proceeding is to treat such cases with piperazin, atophan, urodonal, urosin and similar preparations, together with mineral waters, tub baths and proper diet. The analogy necessitates the same local treatment. Hot compresses, rest and immobilization are necessary. With the diminution of the acute inflammation, massage with nonirritating ointments, followed gradually by more stimulating salves containing ichthyol, hydrargyrum, etc., is indicated. Alleviation of the vascular circulation and of the metabolic products in the lymph channels of the cornea, sclera and anterior chamber through the canal of Schlemm by means of pilocarpin or eserine, is also to be kept in mind. He thinks that scleritis is so often due to gout that we can consider it a symptom of that disease, to be availed of by the internist in those severe cases of gout in which the urinalysis does not give sufficient evidence to make a diagnosis. Kalaschnikow affirms that cases treated along the above lines were invariably cured.

M. W. J.

The Question of Trachoma Immunity.

MEYERHOFF (*Centralbl. f. prakt. Augenheilk.*, June, 1913) reports a case of very acute trachoma beginning five days after the other eye had been operated on by the Heisrath-Kuhnt method of excision of the tarsus. He considers it evidence that long continued trachoma in one eye does not confer immunity on the other eye. In his patient one eye had been trachomatous for three years, the other eye hitherto healthy.

M. W. J.

Enophthalmitis Suppurativa Following Pneumonia.

FEJER (*Centralbl. f. prakt. Augenheilk.*, June, 1913) reports a case of enophthalmitis without histologic findings. It was apparently a metastatic process.

M. W. J.

Edema of the Cornea After Forceps Delivery.

FEJER (*Centralbl. f. prakt. Augenheilk.*, June, 1913). A case of edema of the cornea following use of forceps at birth. He saw the patient four weeks after birth. *M. W. J.*

Vaccinia of the Lid.

FEJER (*Centralbl. f. prakt. Augenheilk.*, June, 1913). A case of vaccine pustule of the lid following arm inoculation. *M. W. J.*

Circumscribed Pitshaped Ectasis of the Fundi.

KRAUPA (*Zeitschr. f. Augenh.*, February, 1914) reports a case of myopia with a bilateral flat pit situated nasally from the papilla. These began $1\frac{1}{5}$ P. D. from the disc and measured $2\frac{1}{2}$ P. D. in the horizontal and $1\frac{1}{2}$ P. D. in the vertical diameter. Their depth was about 2 diopters. They were triangularly oval, the broad base terminating abruptly, while the apex ended toward the disc, more gradually merging into the fundus.

They differed from the true staphyloma posticum in that they were not continuous with the papilla. The arches of the true staphyloma are sharply defined, surrounding the nerve from $1\frac{1}{5}$ P. D. distant. His pits were close to the nerve head and their rapidly converging edges toward the papilla were not abrupt.

That they were colobomata was doubtful because the inner coats of the globe seemed normal in development; and since there was no sign of a preceding inflammation and the affection was bilateral, he rejected the theory of a posterior scleritic process. *J. W. C.*

Unusual Ophthalmoscopic Finding at the Macula in Embolism of the Central Artery of the Retina.

HARMS (*Graefe's Archiv. f. Ophthal.*, Vol. 87, Part 2, 1914; Abst. in *Woch. f. Ther. u. Hyg. des Auges*, October 15, 1914) describes six cases in which there occurred either a ring-shaped, edematous elevation of the retina around the cherry red spot, or within the edematous retina a sharply circumscribed pallor of the macula instead of the typical cherry red spot. *A. C. S.*

Angiogliomatosis (v. Hippel's Disease).

GINSBURG AND SPIRO (*Gräfe's Archiv. f. Ophthalm.*, Vol. 88, Part 1, 1914; Abst. in *Woch. f. Ther. u. Hyg. des Auges*, October 8, 1914) publish a case in which there occurred a tumor at the temporal portion of the nerve with the signs of acute optic neuritis; this was followed by detachment of the retina. The tumor made up of blood vessels, and glia originated from the retina.

In the other eye a solitary yellowish red nodule remained unaltered during a seven-year period of observation. Twenty-three cases have been reported so far. *A. C. S.*

The Use of the Conjunctiva in Ocular Injuries.

HELMBOLD (*Zeitschr. f. Augenh.*, March 14, 1914), a pupil of Kuhnt, follows somewhat the same methods advocated by that author in covering fresh wounds of the cornea and sclera or corneal ulcers, etc. From an experience of one hundred and thirty cases, he found a general anesthetic necessary only in seventeen children. Cocain in no case caused a delay in wound closure, as maintained by Mellinger and Masugi.

After the usual preparation of the region and the removal of any danger from a diseased lacrimal sac, he irrigates with a warm saline solution. If the conjunctiva has lost its elasticity, he uses strips from the conjunctiva of the other eye, the lip or from another person. If the conjunctiva is partially but sufficiently preserved, he cautiously dissects it up and relieves tension by incisions. For central trauma he takes up the conjunctiva about three millimeters from the corneal margin with curved scissors and draws it over until the lesion is covered. By cautious movement of the globe in various directions he notes whether tension on the flap is too great. If necessary, he follows the above dissection of the flap entirely around the cornea until it is possible to cover the entire cornea. Immediately afterward, in order to prevent slipping, he places two silk sutures and fastens them loosely.

With the single and double pedicled flaps there is left a conjunctival defect on the globe which may furnish a danger from infection; on account of necessary twisting, the blood supply may be diminished, and because of the movements of the globe they are difficult to retain in place; also when they have served their purpose and are returned to their normal

position, the latter is covered with epithelium and a movable unsightly swelling is left at the corneal limbus and a new fixation is required. In any case, scars are left. Therefore he now prefers the pouch-like covering. In perforating corneal wounds, he performs an iridectomy.

In order to avoid dazzling from the coloboma he uses a pterygium-like portion of conjunctiva as a partial or complete covering, and has been rewarded with success in twenty-five cases.

In injuries of the sclera he uses the neighboring conjunctiva, taking care to avoid having the conjunctival wound cover the scleral—preferably rather several millimeters distant.

In order to partially cover the cornea he pierces small duplications of the conjunctiva near the limbus, without freshening draws them upon the cornea, and ties the sutures so that they do not lie upon the cornea.

In covering the entire cornea he draws the conjunctiva taken from the two sides so that its wound edges overlap three to four millimeters and places the knots on the seam of the upper flap.

In recent injuries he searches the wound for foreign substances and also removes injured tissue. He does not hesitate to open wounds which have been closed for some time in order to remove fragments of metal, wood, glass, grass, etc. He removes all prolapsed tissue rather than attempting to replace a possible nidus for infection.

If the wound in the cornea or the sclera exhibits a tendency to gape, he places his first (silk) suture where the separation is greatest. If the wound penetrates obliquely, he sutures only the superficial layers. If its plane corresponds to a meridian plane and the wound lips are separated, he includes the deeper layers, but never the entire thickness of the coat, thus avoiding injury to the endothelium or choroid. If clefts still persist through loss of substance, he covers with corresponding flaps for proliferation of new tissue.

Helmhold tabulates his cases in the April and May number of the *Zeitschrift*. There were sixty-six injuries of the cornea, thirty-seven of the corneoscleral margin, and fifteen of the sclera. There were twelve cases of corneal ulcer. The injuries came under observation usually within two days of the accident. The ulcers generally several weeks late.

There was prolapse of the iris in one hundred and thirteen cases, of the ciliary body in three, and of the choroid in one, and of the vitreous in eleven. The lens was injured in fifty-one patients.

He sutured the cornea nineteen times, the sclera eleven times. Nineteen cataracts were immediately extracted and seven were extracted later.

He used the double pedicled flaps twenty-one times, and the pouch-like ninety-six times, of which seventy-eight were partial and eighteen total. After bandaging five to six days one or both eyes, he removed the stitches. There was almost never pain after the operations. Of the one hundred and thirty eyes, twelve came to enucleation, and two to exenteration.

J. W. C.

The Operative Treatment of Detachment of the Retina.

ELSCHNIG (*Archiv. f. Augenh.*, Vol. 6, Part 2 and 3, 1914; Abst. in *Woch. f. Ther. u. Hyg. des Auges*, October 15, 1914) concludes that if within six weeks conservative treatment has proved unavailing, operation is indicated—puncture of the detachment or Mueller's scleral resection. The latter is only to be resorted to in larger retinal defects or in tears of the retina. Six weeks should intervene between the operative attempts. In doing Birch-Hirschfeld's operation caution should be exercised not to withdraw too much fluid or inject too much. Otherwise puncture with simultaneous injection of the vitreous may be considered a valuable addition to the operative therapy of detachment of the retina.

A. C. S.

The Operative Treatment of Detachment of the Retina.

ELSCHNIG (*Med. Klinik*, 1913, No. 46; Abst. in *Woch. f. Ther. u. Hyg. des Auges*, July 16, 1914) tried the following operative procedures: scleral puncture, puncture with cauterization of the sclera, Deutschmann's incisions, Mueller's scleral resection, puncture with injection into the vitreous according to his own method and according to Birch-Hirschfeld, and finally simple restitution of vitreous.

He believes that in only rare instances will puncture completely drain the subretinal space. Puncture with cauterization of the sclera and Deutschmann's operation in his hands proved of little value. Mueller's operation, however, he thinks worthy of further trial and study.

He rather inclines to puncture combined with injection into the vitreous. He recommends withdrawal of only one to one and one-half cubic centimeters of subretinal fluid, this withdrawal, however, being preceded by an injection into the vitreous through a canula introduced in the ora region. As injecting fluid he employs normal salt solution, Tyrode's fluid or normal salt solution mixed with the patient's own blood serum. He is still unable to make positive assertions, but he considers this method an improvement over simple puncture.

He is certain that the operative treatment of detached retina may save eyes which under conservative measures would have been doomed. A. C. S.

The Causative Relation of Retinal Detachment to Accident.

PERLMAN (*Zeitschr. f. Augenh.*, January, 1914), after classification into primary and secondary detachments, concludes:

"1. Accidents which penetrate the globe can lead to detachment, whether the eye is predisposed or not, the causative connection then being indisputable.

2. If a detachment follows a neoplasm, the question arises whether the neoplasm is the result of an accident—in most cases very doubtful.

3. In a healthy eye, a concussion never results in a detachment.

4. Many persons are predisposed to detachment, which may occur without any force from without.

5. If such a person suffers an industrial accident and a coincident detachment, one can, in spite of scientific doubt, still affirm causative relation.

6. A simple industrial overstrain cannot be construed into an accident."

He concludes his article with some of the decisions of the German Insurance Department and of the courts concerning the question as to what constitutes an accident under the term "industrial accident." J. W. C.

Spontaneous Absorption of Cataract.

KRAVET (*Zeitschr. f. Augenh.*, March, 1914) adds two cases to the literature. The first patient's left eye was operated upon in 1902 (because of recent failing vision in the right). Recently he had returned with the history of a frontal sinus

empyema operation in 1910. In 1911 he was wakened with sudden violent pain in the right eye, which radiated to both temples: the eye was prominent and fiery red. Cold compresses were used without relief, and in the first week the pain was so severe that he could not eat, and once he vomited. He had received from a physician some eye drops which caused great pain, and also subcutaneous injections of morphin. He was told that he had "cataractous intraocular pressure," and was dismissed in five weeks. After three or four months without pain, he found that he could see large letters indistinctly, and he now came to the clinic for a glass for that eye.

There was no operative scar visible, the cornea was clear, the anterior chamber deep, the iris tremulous. The pupil was round, reacted sluggishly to direct light, the consensual reaction was more prompt. The pupil was occupied by secondary membrane, the lens was absent, the vitreous clear, the fundus fairly distinct. The papilla was pale and surrounded by a small halo. The vessels were bent sharply at its margin. The tension of O. D. measured 25 mm. V. = $5/15$ with + 11 D. The tension of O. S. measured 35 mm. (?) V. = $5/75$ with + 11 D.

The second case was that of a healthy woman, fifty-three years old, whose left eye was operated upon in 1902 for cataract. This eye had always seen less than the other and indeed diverged. She had worked with the right eye until fourteen days before, since which her vision had been only light perception. The anterior chamber was normal, the pupil was easily dilated. The anterior cortex was clouded with glistening mother-of-pearl opacities, the nucleus indistinct.

In 1910 the patient came with the history of occasional discomfort, which had disappeared promptly under warm compresses. The patient complained of occasional heart palpitation, and recently her feet have been swollen at times. "This morning, while feeling perfectly well, she was seized with violent pain in the right eye. In a short time her daughter noticed that the eye had become entirely white. The pain increased, accompanied by nausea and vomiting. The patient admitted an apoplectic attack two years before." The right eye diverged, there was marked conjunctival injection with slight ciliary injection. The cornea was so very cloudy that it had the appearance of a lime burn. The anterior chamber

was deep, but the tension was $+ 3$. Light perception was prompt, but projection faulty. She was given eserin four times daily. The eye passed through what seems to have been a purulent iridocyclitis, accompanied by hypopyon, chemosis, hemorrhage from the iris, cholestearin crystals on the membrane of Descemet, anterior lens capsule and iris. When the cornea had cleared, the lens cortex appeared fluid, both lens and iris were tremulous, the nucleus changed its position at times and in a month the patient could count fingers at one-half meter.

J. IV. C.

Concerning Postoperative Visual Disturbances and Blindness of Nasal Origin.

ONODI (*Zeitsch. f. Augenh.*, March, 1914) reviews the literature of the cases of injury to the optic nerve during and after operations in the nose and accessory sinuses, finding in all thirteen cases up to that time:

(a) Frontal Sinus Operations.—Wohlmüt saw, after injury to the right frontal, the orbital edge and the occiput, blindness of the left eye, and attributed the latter to an indirect fracture of the left optic canal. Traumatic indirect fracture of the optic canal was already known, Hoelder having found fifty-three cases.

Freudenthal published a case in which, after the Killian operation, the left eye became blind, and after six weeks atrophy of the nerve was evident.

Oppenheimer and May reported an indirect fracture of the optic canal as the cause of blindness after a Killian.

Quix observed in a case after the Killian operation on the frontal on the same side (left) an optic neuritis with diminished vision and narrowed field which vanished after several weeks.

Senator mentions a case in which an intranasal opening of the frontal sinus with a trephine was immediately followed by blindness, which he explained by supposing a fissure which involved the optic canal and extended to the chiasm.

Onodi explains these cases by supposing an indirect fracture of the optic canal caused by the use of the chisel and hammer; but the electric intranasal trephine may injure the nerve on account of the often close relation of the frontal sinus to the optic canal and also the close proximity of the

nerve when in the sphenoidal sinus to the bulla ethmoidalis and anterior ethmoidal cells which are one with the outlet of the frontal sinus.

(b) In emptying the sinuses of an empyema in those cases in which the nerve lies free in the posterior ethmoidal cells and sphenoidal sinus, an injury to the nerve may take place. He has found the bony wall of the canal in some of these cases extremely thin and often ten to twelve millimeters long.

(c) Of septum operations three cases have been reported. The case of Laas and Lewy followed the removal by chisel of a spine situated posteriorly. There ensued a large defect in the visual field followed by pallor of the papilla.

Kuttner and Lehmann observed, after removal of a septum exostosis with the electric saw, a left amaurosis and right temporal hemianopsia.

Hintner reported an amaurosis of the left eye and a right temporal hemianopsia after the removal of a left sided septum exostosis with the saw.

Onodi considers the possibility of an indirect fracture of the optic nerve region in those cases in which the posterior ethmoidal cells and the sphenoidal sinus extend above the septum. In one of his preparations the right sphenoidal sinus extended in the middle line between the posterior ethmoidal cells above the septum fifteen millimeters from the sphenoid bone. In another, the left sphenoidal sinus extended above the septum, its middle third forming the sulcus opticus and in close relation with the chiasm. These relations explain the occurrence of indirect fracture with homolateral or contralateral visual disturbances, especially in those cases in which the canalis opticus lies in the sphenoidal sinus.

(d) After removal of polyps there were four cases. Schmidt-Rimpler described an atrophy of the optic nerve.

Matthews reported immediate blindness in a forty-five-year-old woman.

Ziem found a double optic atrophy.

Purtscher removed polyps from the middle meatus and there followed immediately a complete bitemporal hemianopsia, a defect of the right upper and inner quadrant and a pale white yellow right papilla. The operation consisted in the old forcible tearing and twisting with forceps. However, the

newer methods with the snare, or in case of the higher and deeper polyps with bone forceps, may also tear out a piece of bone with the polyp. An indirect fracture also explains these cases in view of the above mentioned possibilities in anatomic relations.

(e) Turbinectomy, two cases. Marsch described two cases of blindness on the same side immediately after removal of the middle turbinate, caused by indirect fracture of the optic canal due to deep injury resulting from forcible turbinectomy.

Onodi attributes these cases also to the fact that the optic canal often lies in the posterior ethmoidal cells and that the sphenoidal sinus may extend to the bulla ethmoidalis and to the anterior ethmoidal cells.

J. W. C.

Progressive Disease of the Opticus After Cranial Traumatism.

DE KLEIJN (*Graefe's Archiv. f. Ophthalm.*, Vol. 87, Part 1, 1914; Abst. in *Woch. f. Ther. u. Hyg. des Auges*, July 16, 1914) reports a case in which, after fracture of the base, there occurred progressive visual disturbances. These he ascribed to callus formation at the base of the skull, though this supposition could not be verified by X-ray examination.

A. C. S.

Investigation of Changes in the Visual Field in Nasal and Accessory Sinus Disease.

MARBEREITER (*Zeitschr. f. Augenh.*, April-May, 1914) makes her report from one hundred cases of empyema examined in two years in the nose and throat clinic of the Hungarian University at Klausenburg. She selected only intelligent patients with normal vision and fundi, and excluded all of those with ocular disease not resulting from nasal trouble; also all those with ocular affections which presented similar appearances or field changes—e. g., myopia, hysteria, toxic retrobulbar neuritis, pigmentary degeneration, sympathetic ophthalmia, diabetes, multiple sclerosis, myelitis, glaucoma, specific chorioretinitis (Foerster), medullated nerve fibers.

She calls attention to the view expressed by Bungi, that in alcoholic neuritis the blind spot is not invaded by the scotoma, but that in rare cases the enlargement of the blind spot may exist coincidentally with the central scotoma and independently.

The perimetric examination was begun with charting the blind spot in order to avoid fatigue; five millimeter objects were used.

In fifty-four healthy persons the blind spot was oval, measuring seven degrees vertically and four to five degrees horizontally. Its position was usually one to two degrees under the horizontal and twelve to fifteen degrees from the center.

When possible, the examination was made before and after the operation. The enlargement was always greater for colors than for white.

In many empyemas demonstrable changes in the field and nerve were present, in spite of normal vision and fundus. The enlargement of the blind spot may be the first and only symptom and disappear with sinus recovery, returning with relapses. Therefore, the field should be examined in every sinus trouble. The patient often is not conscious of visual impairment as long as the other eye sees well. In addition to enlargement of the blind spot, there may be present central scotoma, concentric, temporal or nasal defects or ring scotoma.

She has seen one case of narrowing of the field to ten degrees, which disappeared after release of the pus; also a ring scotoma in the region of the equator in connection with an empyema.

Peripheral defects which vanish with the recovery of the empyema may be confused with the picture of glaucoma, on account of the headache. In one case two years before, after an influenza, the patient had both empyema and acute glaucoma in both eyes. Iridectomy relieved the glaucoma, but the empyema still persists.

She has also found that enlargement of the blind spot is much more frequently the first symptom than is central scotoma. She saw no case like that of v. der Hoeve, in which the blind spot extended to a central scotoma. v. der Hoeve and Kleyn considered the presence of enlargement of the blind spot indicative of empyema of the posterior sinuses, and that the anterior sinuses were excluded. She has also found it many times in disease of the anterior sinuses.

v. der Hoeve mentions only one case in which Highmore empyema caused enlargement of the blind spot. The author found it in disease of anterior and posterior sinuses, the

monolateral form causing bilateral ocular changes and the bilateral empyemas causing monolateral field changes and exceptionally also contralateral changes.

In many of Markbreiter's cases the narrowing of the field began to disappear almost immediately after evacuating the pus—in one case in one-half to one hour. Causative factors alone or combined are extension of inflammation, disturbance of circulation and toxic effect. The rapidity of the course of the disease, e. g., where the scotoma vanished one-half to one hour after the operation, can only be ascribed to toxic or circulatory causes; but in those cases in which the visual disturbances persisted after the pus was released, the causative factors were inflammatory pathologic changes in the nerve.

She considered that the occasional crescent shaped enlargement of the blind spot, with its concave side toward the center, in that it corresponds so closely with the course of the vessels, is probably caused by circulatory disturbance. The scattered "island" defects found rather frequently she classifies under circulatory disturbances, and the peripheral limitation under both circulatory and toxic.

There were sixty-three sinus cases, nine posterior sinuses, combined anterior and posterior three cases, and twenty-five ambulatory cases were uncertain.

The sixty-three anterior sinus cases were divided into: Seventeen frontal sinus, thirty-one maxillary sinus, three anterior ethmoidal, one anterior ethmoidal and frontal. Twelve cases were classified only as "Disease of the anterior accessory sinuses."

Of the one hundred patients examined, seventy had changes in the visual fields with almost no changes in the vision or fundus. In only three cases was there optic neuritis.

Of the sixty-three anterior sinus cases, forty-eight had field defects and scotomata. Of the nine posterior sinus cases, seven had field defects. Sixteen of the above seventy recovered through endonasal treatment or operation. Four retained the ocular findings, and fifty did not return for examination.

There were fifty-two enlargements of the blind spot and seven central scotomata. The remaining eleven showed peripheral limitations, ring scotoma or scattered "island" defects.

Twenty-eight of the fifty-two enlargements of the blind spot were single, the rest were combined with other defects. Central scotoma alone was found six times, and only once with other defects.

The fifty-two enlargements of the blind spot were divided as follows:

Empyema of the frontal sinus.....	10	cases
“ “ all of the sinuses.....	4	“
“ “ the sphenoid	4	“
“ “ Highmore and anterior ethmoid	3	“
“ “ sphenoid and frontal.....	2	“
“ “ anterior sinuses (Neben- hoehlen)	7	“
“ “ posterior ethmoid cells	3	“
“ “ anterior ethmoid cells	3	“
“ “ maxillary sinus	16	“

In bilateral empyemas there were seven bilateral and thirteen monolateral enlargements of the blind spot. In monolateral empyemas there were nineteen homolateral enlargements of the blind spot and eight contralateral.

Thirty-seven cases of nonpurulent nasal disease were examined, and eleven of these showed ocular changes.

In seven cases of rhinitis hypertrophica there were two enlargements of the blind spot alone, two fields limited and one enlargement of blind spot with narrowing of the field.

In three cases of rhinitis atrophica, one showed narrowing of the field, two showed "island" defects with blind spot enlargement.

One case of rhinitis simplex showed blind spot enlargement with island defects. Five of these cases recovered: One ozena under treatment, two blind spot enlargement after turbinate resection, two cases of narrowing of the field after septum resection.

J. W. C.

The Degree of Intracranial Pressure in Certain Ocular Affections.

HEINE (*Muench. med. Woch.*, 1913, No. 44; Abst. in *Woch. f. Ther. u. Hyg. des Auges*, July 9, 1914), in his first contribution regarding the degree of intracranial pressure in nystagmus and in neurotic affections of the cornea, expressed the

view that these ocular affections were but symptoms of a latent meningeal irritation resulting in increased intracranial pressure.

Perhaps the causative factor is not always a latent meningeal irritation, but a toxic or infectious constitutional abnormality.

In twenty-five cases of *ulcus serpens*, spontaneous, traumatic or catarrhal infiltrate he found normal lumbar pressure (up to 150) fifteen times. In five the tension was two hundred and in five others three hundred.

In twenty-eight cases of ocular injuries (perforating and contused) in healthy adults and children the lumbar pressure was increased slightly in ten, moderately in six and was normal in twelve. A study of the clinical histories shows that severe and mild injuries of the eye in healthy individuals may give rise to increased intracranial pressure, headache, vertigo, etc. These are probably not simply a reflex manifestation, but may be attributed more or less to psychologic influences.

A. C. S.

Ophthalmoscopy of the Angle of the Anterior Chamber.

SALZMAN (*Zeitschr. f. Augenh.*, January, 1914). Is important because slight changes significant to the welfare of the eye can often be seen by this method, which was at first only practicable in hydrophthalmus and a few myopic eyes with deep anterior chambers and well curved corneæ. It seemed impossible in glaucoma (where it would be especially valuable), because of the shallowness of the chamber, but he believes he has found a method to overcome this obstacle.

With eyes of not too flat cornea and deep anterior chamber, he has the patient turn his head and eye so far that he receives only a profile view of the cornea. Using the concave mirror and indirect method, because it is more nearly independent of the refraction of the eye and of astigmatism, a small aperture permits the use of the "best portion" of the rays from the anterior chamber. Since the object (anterior chamber) lies forward, the rays are divergent, therefore, the lens must be held farther from the eye than usual. The inverted image is at a greater distance from the lens and the observer must be placed farther away than usual. One can enlarge the image by advancing the lens nearer the eye.

The chamber angle is only visible from a direction perpendicular to the axis of the examined eye, with the exception of a few favorable cases of hydrophthalmus, etc.

The chamber angle, which under natural relations cannot be examined by this method, may be adapted to the necessary optical conditions only by means of a contact glass. He has used the original contact glass of Fick with a radius of eight millimeters, but because this is ill suited to the often small cornea of glaucomatous eyes and shallow anterior chamber, one must have one or several glasses of greater curvature.

J. W. C.

The Early Diagnosis of Glaucoma. Investigations Concerning the Central Visual Field With Test Objects Within a Small Visual Angle.

SEIDEL (*Graefe's Archiv. f. Ophthalm.*, Vol. 88, Part 1, 1914; Abst. in *Woch. f. Ther. u. Hyg. des Auges*, October 8, 1914) found in a number of eyes by Bjerrum's method, small scotomata above or below the blind spot without other glaucomatous manifestations. These were much smaller than those described by Bjerrum and consequently easily overlooked. These occurred in a number of apparently healthy eyes with normal tension whose fellow eyes showed certain glaucoma, also in the earliest stage of the disease, unassociated with increased tension. Even in the later stages excavation may be absent, the ophthalmoscopic picture resembling that of optic atrophy.

The small scotomata adjoining the blind spot may disappear after the reduction of tension, likewise the Bjerrum's scotomata which have an arched or half ring shape. A. C. S.

Experimental Investigations Concerning the Action of Eel Serum on the Human and Animal Eye.

STEINDORFF (*Graefe's Archiv. f. Ophthalm.*, Vol. 38, Part 1, 1914; Abst. in *Woch. f. Ther. u. Hyg. des Auges*, September 17, 1914) claims there are individuals with conjunctivæ entirely immune to the irritating action of eel serum. The conjunctivitis induced by this serum is more or less violent, subsiding within one to six days. The serum of different eels is of variable toxicity. The poisonous and hemolytic properties of the serum is destroyed by heat. Animals which have been treated with intravenous injections of calcium chlorid react

less vigorously to subconjunctival injections of serum than animals not so treated.

After intravenous injection of eel serum a marked miosis ensues—a miosis more pronounced and more protracted than after alkaloidal miotics. On account of its variable toxicity the serum has no therapeutic value. *A. C. S.*

Experimental and Clinical Investigations Concerning the Inhibitory and Destructive Action of Aniline Color Products Upon Pathogenic Bacteria of the Eye.

ROEMER, GEBB AND LOEHLEIN (*Graefe's Archiv. f. Ophthalm.*, Vol. 87, Part 1, 1914; Abst. in *Woch. f. Ther. u. Hyg. des Auges*, July 16, 1914) first show why Stilling's investigations in 1890 proved of no therapeutic value. However, they corroborate Stilling's fundamental thought, namely, that a large number of anilin color products act strongly bactericidal on certain pathogenic germs, but that in the majority of these products the action upon different microorganisms is widely different; in other words, a particular pathogenic ocular germ can only be combated by particular color products or a mixture of color stuffs.

The practical experiences are most encouraging in diplobacillary infections of the conjunctiva and cornea, less striking in pneumococcic infections. In gonococcic and trachomatous infections good results have also been observed.

A. C. S.

Salvarsan in Herpes Zoster Ophthalmicus.

GEBB (*Med. Klin.*, 1914, No. 26; Abst. in *Woch. f. Ther. u. Hyg. des Auges*, October 1, 1914) reports two cases in which intravenous injections of salvarsan and neosalvarsan respectively brought about immediate improvement. Upon the corneal ulcerations, however, the treatment had little effect, a cure of the corneal affection not occurring until several weeks had elapsed.

A. C. S.

Treatment of Ciliary Blepharitis With Levurinoso Yeast Soap.

KORN (*Allg. med. Centr. Ztg.*, No. 30, 1914; Abst. in *Woch. f. Ther. u. Hyg. des Auges*, October 15, 1914) has achieved good results with histopin ointment, but found it rather irritating. Surprisingly good results were obtained with levurinoso yeast soap. The face is washed with warm water and this

soap and the lather applied to the lids, where it is allowed to remain for some time. Rinsing the face with water disposes of all crusts and scales. Continued employment of this soap prevents further formation of such scabs, but the treatment must be protracted. This treatment is also recommended in facial acne and eczema. A. C. S.

Ophthalmoblenorrhoea Cured by Large Doses of Autovaccines.

SZILY (*Med. Blätter*, 1914, No. 13; Abst. in *Woch. f. Ther. u. Hyg. des Auges*, July 30, 1914). The writer's case was an eighteen-year-old girl whose right eye showed typical gonorrhoeal conjunctivitis. The first intramuscular injection of three hundred million cocci was followed by rapid improvement within twenty-four hours. Another injection of six hundred million cocci was given. On the third day secretion had disappeared. Two further injections of eight hundred million cocci each were administered before the patient resumed her occupation on the fifth day. A. C. S.

The Significance and Value of Pellidol in Ophthalmology.

DUTOIT (*Graefe's Archiv. f. Ophthal.*, Vol. 88, Part 1, 1914; Abst. in *Woch. f. Ther. u. Hyg. des Auges*, October 8, 1914) achieved good results with pellidol in eczematous conjunctivitis and keratitis, in chronic relapsing keratitis and in traumatic infected wounds of the cornea. Since pellidol has no real antiseptic properties, necrotic tissue should be removed before its introduction. Pellidol ointment never stains, and the resulting scars frequently show a surprising transparency. A. C. S.

The Treatment of Recurring Corneal Erosions With Scarlet Red.

SCHREIBER (*Graefe's Archiv. f. Ophthal.*, Vol. 87, Part 1, 1914; Abst. in *Woch. f. Ther. u. Hyg. des Auges*, July 2, 1914) considers scarlet red ointment a very effectual medication in this affection, provided the ointment is introduced in sufficient quantity and a pressure bandage is applied. Since the ointment is not antiseptic, it is contraindicated in infectious corneal processes. Pellidol and azodolen are of less value. Even in late recurring erosions of the cornea, a rapid and permanent cure was brought about by five per cent scarlet red ointment. A. C. S.

ABSTRACTS FROM SPANISH OPHTHALMIC LITERATURE.

BY

WILLIAM H. CRISP, M. D., OPH. D. (COLO.),

DENVER.

Total Bilateral Hysterie Amaurosis of Short Duration.

LEOZ ORTIN, GALO, Madrid (*Archivos de Oftalmologia*, September, 1914, p. 465). An unmarried woman of twenty-two years had had frequent attacks of hysterical unconsciousness, at first associated with the menstrual period, but recently occurring at any time, and sometimes several times during the same day. On coming out of an especially severe attack the patient asked to have the lamps lit, although the sun was shining into her room. She appeared to be absolutely blind. She was told that the room had been darkened for treatment of her general condition. For the purpose of examination the room was actually darkened without anything being said to the patient. Tests were made by bringing a strong electric lamp close to her eyes, and in other ways, without producing the least indication that any vision was present, although the pupils reacted fairly well. There was slight corneal and conjunctival anesthesia. Vision returned during the night in an interval of wakefulness, and was apparently normal next day. The author is satisfied that there was no question of simulation. There was some inversion of the color fields.

Lymphatic Circulation in the Living Eye and in Other Organs.

URIBE Y TRONCOSO, M., Mexico (*Anales de Oftalmologia*, August, 1914. Also appears in July-August issue of *Klinische Monatsblätter für Augenheilkunde*, 1914). Recalling previous experiments which were the subject of an earlier article (*Annales d'Oculistique*, October, 1909), the author describes a new series of experiments undertaken with the object of disproving the contention of Weiss, that the aqueous humor is not excreted by the canal of Schlemm, and with the further purpose of determining whether the lymphatic circulation of any other part of the body is similar to that of the eye. As regards the eye the experiments were conducted on living

rabbits, which offer the advantage that the eye is capable of being luxated in great part outside the orbit, without any loss of anatomic or functional integrity. After cutting the hair of the lids and around the eye, the eye is cocainized and the conjunctiva and superior rectus muscle are seized with forceps. Making steady traction, after a few minutes the muscles relax little by little and the eye comes out of the orbit. The position of exophthalmus is maintained by means of a suture, which, however, must not cause excessive constriction.

The conjunctiva is cut close to the limbus and dissected back from the sclera, and the muscles are severed at their scleral insertion. The central ends of the anterior ciliary arteries soon stop bleeding, but drops of blood continue to come from the vascular plexus at the corneal limbus, and from the perforating anterior ciliary veins, on the sclera.

Stripping back the conjunctiva the anterior segment of the globe is passed through a circular opening in a piece of rubber dam, which is secured on the animal's head. The head is then so placed that the cornea of the eye which is being used is directed downward. The eye is dried with a compress, and is immediately immersed in a cup-shaped receptacle containing olive oil. The cup should be neither too large nor too small. The cup generally employed by the author had a diameter of 0.025 m.

After an interval of ten minutes, three or four large drops of blood have collected at the opening of the perforating veins on the sclera. Along the limbus are seen other drops, smaller, and of a rose-colored or entirely transparent fluid. At the end of twenty minutes the whole circumference of the corneal limbus is covered with fine transparent drops, which almost touch one another. In the sixteen rabbits used by the author there was a great variety in the arrangement of these limbal drops. Sometimes there was a complete collar of fine drops; at other times there were groups of drops, with empty spaces between; and finally in rare cases large clear or slightly rosy drops were formed at the muscular insertions. There was no oozing from any other part of the sclera.

The experiment was continued from forty to sixty minutes, during which period the drops that fell from time to time into the olive oil were steadily replaced by others. By centrifuging, the fluids which escaped from the eye into the

olive oil were separated into three layers: (1) a blood coagulum; (2) a transparent or rose tinted liquid; (3) a thin layer of white fibrinous coagulum. The amount of liquid was three or four times greater than that of coagulum. This is contrasted with the proportions in blood taken from the ear of the rabbit, viz., two of coagulum to one of serum. After allowing for that part of the centrifuged fluid which was derived from the blood of the ciliary vessels, the amount of aqueous humor passing every minute through the rabbit's anterior chamber was estimated at 4.8 c. mm. The constancy of the filtration was proved by dividing one experiment into two periods of rather more than half an hour each. An equal amount of fluid was excreted in each of the two periods.

In order to compare the excretion from the eye with that from another part of the body, a series of experiments was made as to the lymph flow from the testicle. This organ was chosen, both on account of its richness in lymphatics, and because of the facility with which it could be subjected to the same kind of observation as had been undertaken on the eye. The animals used were rabbits and dogs, and the experiments were made at three depths from the skin surface. The first, or subcutaneous layer, gave a scarcely appreciable quantity of lymph. The second layer, or that containing the deep lymphatics as far as the cremasteric fascia, also furnished an insignificant quantity of lymph. The tunica vaginalis propria of the testicle yielded a continuous flow of lymph.

Uribe y Troncoso concludes that the chambers of the eye are physiologically similar to the serous cavities of the body, and that the canal of Schlemm is not a venous channel, as claimed by Leber, but a lymphatic canal. For if it contained blood, since all the fine perforating vessels of the limbus are in communication with it, drops of blood instead of lymph should issue from the openings of the divided branches. Since the liquid which escapes from them is almost pure lymph, the canal must contain lymph in the normal state. Furthermore, the blood pressure in the veins of the iris is greater than the intraocular pressure, so that it is not admissible that in the normal state the excretion of the aqueous occurs through these veins. But when the intraocular pressure suddenly rises and becomes superior to that in the veins of the iris, an excretory current by way of the venous system may be set up, until the intraocular pressure falls to normal.

ABSTRACTS FROM SCANDINAVIAN OPHTHALMIC LITERATURE.

BY

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A Case of Pronounced Unilateral Melanosis Sclerae With "Goose-Skin-Like" Warty Pigment Deposits in the Iris, and Hyper-pigmentation of the Fundus.

GJESSING, H., Drammen (*Norsk Magazin for Laegevidenskaben*, 75th year, p. 793). The patient was an otherwise vigorous girl of nearly five years. Her parents, who were not blood relations, were both dark haired. The child's left eye was much more heavily pigmented than the right, the deposits of pigment in the sclera giving it a spotted brownish to blue-black appearance. The iris was so crowded with pigment that the iris structure proper was completely obliterated, and instead of the normal elevations and crypts present in the right eye, the left iris contained such a number of warty pigment masses as to suggest the aspect of goose-skin. The fundus of this eye was also much more heavily pigmented than that of the other. The author discusses the rarity of the case, only four instances of this condition of the iris having previously been published; and also the danger of malignant degeneration in such eyes, melanotic sarcoma developing, according to the literature, in as many as twenty-five per cent of the cases of melanosis sclerae.

Optochin in Pneumococcus Infections of the Eye, Especially in Ulcus Serpens Corneae.

LYSTAD, HARALD, Christiania (*Norsk Magazin for Laegevidenskaben*, 75th year, p. 1474). This new quinin derivative (known scientifically as ethylhydrocuprein) has a specific or directly toxic action on pneumococci of the most varied strains, although scarcely or not at all upon a number of other bacteria with which experiments have been made. It is commonly used in one or at most two per cent watery solution of the hydro-

chlorid, being instilled freely every one or two hours. The solution must be fresh (not older than three weeks), and must be kept in a brown glass container. The first instillation hurts slightly, the later ones usually not at all, since optochin produces a prolonged anesthesia or hypoesthesia of inconstant character. Two per cent optochin oil seems to be inactive, but the one to two per cent salve of the basic drug is perhaps as efficient as the watery solution.

In most cases of *ulcus serpens corneae* the use of optochin causes a prompt arrest of the advance of the disease, and exceptionally rapid cleaning of the ulcer as well as a less dense opacity than usual. In dacryocystitis, it is not possible to get rid entirely of the pneumococcus, but the use of the new drug seems to produce a marked diminution in virulence, resulting in a marked lessening of the suppurative element in the discharge. In pneumococcus bearers, who carry the pneumococcus in a normal or chronically slightly inflamed conjunctiva, the pneumococci can be disposed of in twelve to twenty-four hours with a one per cent solution, used every two hours; a fact which is likely to prove important in preparing for eye operations, or in the presence of erosions and foreign bodies.

SOCIETY PROCEEDINGS.

BY

ARTHUR J. BEDELL, M. D.,

ALBANY.

CHICAGO OPHTHALMOLOGICAL SOCIETY.

Regular Meeting, held October 19, 1914. Dr. Wesley Hamilton Peck, the president, in the chair.

Conservative Treatment of Penetrating Wounds of the Eyeball.

Dr. Albert E. Bulson, Jr., Fort Wayne, Indiana, said it was his experience to see and care for a large number of eye injuries, and in looking backward it seemed as though the proverbial peck of seriously injured eyeballs had been removed because conscientious judgment seemed to indicate the preservation of the eyeball without serious danger to the fellow eye was an impossibility. With increasing experience it seemed to him that some of the eyeballs that were sacrificed might have been saved. Yet in making this statement he was not unmindful of several serious as well as pathetic results, due to mistaken judgment in following conservative treatment, that had come to his attention.

He presented a brief report of three such cases with a view to elucidating the subject.

In all these cases the exciting eye showed no marked signs of improvement while under treatment for the existing uveal disturbance, and under such circumstances it would seem that without favorable progress during the first seven to ten days subsequent to the injury, early enucleation was indicated.

There was a happy mean between conservatism and radicalism when it came to a decision as to what treatment served the patient's interest best in penetrating injuries of the eyeball. That many injured eyeballs were slaughtered ruthlessly

because the surgeon desired to be on the safe side, could not be doubted, but while every ophthalmologic surgeon should have a wholesome fear of sympathetic inflammation, it was his duty to consider carefully all the possibilities for both good and harm, and to adopt any measures that offered hope of saving either vision or eyeball without incurring undue risk. Taking into consideration those extremely rare cases where sympathetic inflammation had occurred after a prompt enucleation, thus indicating the rapidity with which the sympathetic process might develop, he still maintained that in a large proportion of penetrating wounds of the eyeball, even in the ciliary region, we were justified in making an attempt to save the eye, not forgetting that such an eye required clinical observation, and with the decision that the condition was growing worse instead of better, enucleation should be performed at once. He was also strongly of the belief that mercury and sodium salicylate given internally and carried to the physiologic limits, and the subconjunctival injection of a solution of cyanid of mercury greatly aided in the prevention of sympathetic inflammation. Hexamethylenamin also might be employed with possible benefit.

As an example of cases that at the time of injury might have been considered appropriate for enucleation, the following case was reported:

F. L., male, age seventeen years. Brought by family physician for enucleation. Gave a history of being struck in the right eye with a ten-penny nail flying from the hammer of a fellow workman. The nail penetrated the eyeball and was pulled out by the patient. Examined two hours after the injury. The eye presented an irregular wound about three millimeters in length extending backward from a point about two millimeters from the sclerocorneal junction. A small bead of vitreous and a button of iris presented. Vision nil, as the anterior chamber was full of blood. The button of iris was very carefully crowded forward with a sterile spatula, the edges of the scleral wound touched with tincture of iodine, and the conjunctiva slid over the wound and stitched. Patient put to bed and given ninety grains of sodium salicylate per day. An uneventful recovery resulted, and with correcting lenses vision of 20/20 was regained. At no time was there any marked injection or tenderness of the eyeball, and

the favorable result had continued now for considerably over a year.

Two similar cases were cited.

In the management of these cases of penetrating wounds of the eyeball several things were worthy of consideration. If there had been considerable loss of vitreous in connection with injury of the ciliary region, enucleation or one of its substitutes was indicated. The same was true of extensive injuries of the ciliary body, iris and lens. Injury to eyes that were already the seat of a pathologic condition were also more likely to require immediate removal. Injuries accompanied by the retention of a foreign body in the eyeball formed a group of cases that should be managed according to well established rules.

Scleral stitches were not only difficult to place in the edges of a punctured wound, but were unnecessary if the conjunctiva was slid over the wound and carefully stitched. Furthermore, the conjunctival flap had a tendency to prevent secondary infections which were a prolific cause of mischief in trauma cases. He was a firm believer in the efficacy of tincture of iodine or twenty-five per cent of trichloroacetic acid touched to the wound edges; and unless iodine had been used, he dressed with bichlorid ointment all of his operative cases.

The patient should be put to bed and kept there for a week. A calomel cathartic, followed by large doses of sodium salicylate, acted beneficially in preventing untoward results. Hexamethylenamin in large doses was also of possible benefit, although its irritating effect upon the urinary tract must be taken into consideration. The development of pain, tenderness and increased congestion were indications that progress was not satisfactory, and if those, or any one of those symptoms continued, the eyeball should be enucleated. Generally the fate of the eyeball according to these rules would be known within ten days or two weeks following the injury. No chances should be taken in a uveal inflammation of traumatic origin.

Discussion.—Dr. Frank E. Brawley said it was a routine measure with him to use large doses of urotropin in the beginning of these cases. At least one hundred grains a day should be given in solution without the addition of any salt, such as sodium citrate or any of the alkaline salts, because the

fluids of the body must be slightly acid if the urotropin was to be broken up properly and exert its prophylactic action. When there was irritation of the urinary passages the urotropin should be stopped for a while and several doses of some alkali given to alkalinize the urine and stop the urotropin from breaking up. Experiments of Kopetsky, of New York, had shown the great value of urotropin.

Dr. Thomas Faith said conjunctival sliding in Dr. Bulson's cases was a very important thing. If there was primary infection, one could not do anything with it. The conjunctival flap would prevent secondary infection. The bichlorid ointment was valuable in these cases. Another thing was the patient should be given a chance to recover without meddlesome dressings. We should leave the eye tied up long enough to let the conjunctival flap unite before washing it out and putting in a solution, because sometimes in hospitals, where they were supposed to be careful, the droppers were not clean, the solution was not sterile, and something was introduced that caused trouble. If we let it go for forty-two or seventy-two hours the conjunctiva would be sufficiently united to the edge of the wound to protect it in the future. He had been surprised at the number of eyes he had been able to save by using a conjunctival flap.

Dr. Bulson, in closing, said the principal object in presenting these cases was to call attention to the possibility of saving many eyes that formerly were thought to be hopeless. Many eyes were enucleated that might have been saved.

Expulsive Retrochoroidal Hemorrhage Following Cataract Extraction.

Dr. Horace M. Starkey, Rockford, Illinois, reported the following case: The patient was Mrs. W., aged eighty-seven years, an acquaintance and patient for about twenty-five years. Commencing central opacity of the right lens was first noted April 20, 1906, and a little later cataract also began to develop in the left eye and progressed until 1913, at which time there was good perception and projection in the right, while in the left scarcely sufficient sight remained to enable the patient to get around her own house. Incidentally it might be mentioned that during this time a hyperopia of 2 D. was converted into a myopia of 4 D.

During the past few years the patient's general health had been rather precarious, and while operation was frequently requested, consideration of it was postponed from time to time until the health should continue favorable for a longer time. During the first part of 1914 the condition steadily improved until by July it was felt that the desired operation might be permitted.

There was nothing in Mrs. W.'s condition to cause more fear of hemorrhage than in the average patient, but rather the contrary. Her arteries were not degenerated, her physician, Dr. Helm, having stated that the arteries were more those of a woman of sixty-five than one of eighty-seven. The blood pressure a short time before the operation was one hundred and thirty and never seemed much above that.

It was decided that the greatest safety lay in a preliminary iridectomy, and this was accordingly performed July 9th. The patient was quite nervous about the operation and made a sudden movement as the section of the cornea was about complete, so that the point of the keratome punctured the capsule, but a good iridectomy was done. The patient suffered a rather severe shock with nausea and vomiting lasting a day or two, but made a good recovery with satisfactory coloboma and white sclera, so that by August 12th it was considered advisable to proceed with the extraction, in which he was assisted by Dr. Fringer. The operation was typical, the section being smooth and ample and the lens coaxed out with a minimum of pressure or other manipulation. The speculum was removed and the patient, who had behaved very well, was told that the operation was over and that she should rest quietly with lightly closed lids for a few moments when the eye would be dressed and she could return to her room. Very quickly a little vitreous appeared between the closed lids, the patient commenced to groan with pain, more vitreous and then blood appeared, and then the hemorrhage became quite profuse and the pain very severe. This hemorrhage lasted perhaps five minutes. It was impossible to tell just what ocular tissues were present in this escaping blood.

The patient suffered very severe shock and was so reduced that death seemed imminent for several days. She had gradually improved, but even now, after two months, was so weak that she could not sit up at all.

The eye healed in a few weeks, and there was now little irritation. The upper part of the cornea was opaque, but there was but slight atrophy of the globe, showing that not all the contents of the eye were expelled.

There had been so relatively few of these accidents reported that it was deemed advisable to add this one to the list.

Discussion.—Dr. Albert E. Bulson could sympathize with Dr. Starkey, as he had had two such cases in his own experience during the last twenty-two years. He also mentioned a case that occurred in the practice of Dr. de Schweinitz, of Philadelphia.

In Dr. Bulson's first case the man had only one eye, the other having been destroyed by a gunshot injury. At any rate, there was some trauma, and the man came to him with a senile cataract. He had the patient carefully examined by an internist, something he did not always do. The urine was also examined carefully, and the internist thought the man was in fine condition for an operation. The combined operation was done and the extraction was perfectly uneventful. The speaker flattered himself in getting a splendid result, but after removing the speculum and telling the man the operation was over and he would soon be able to return to his room, in waiting for the collapsed cornea to fill up a little so that the dressing could be applied and the man be able to return to his room, the man began to groan, and as Dr. Bulson looked over toward the table on which the patient was lying he saw blood gush out from the corner of the eye, and it seemed as though the whole eyeball was coming out on the cheek. However, the bleeding stopped, the man was put to bed, and made a satisfactory recovery.

Dr. Thomas Faith spoke of similar cases occurring in the practice of Dr. Fisher and Dr. Dodd.

Extraction of Metallic Foreign Body From Vitreous by Giant Magnet Through Scleral Incision.

Dr. Carroll B. Welton, Peoria, Illinois, spoke of the things that influenced the prognosis of the eye from penetrating metallic bodies, and asked the question, what should be the procedure in eyes that contain a chip of metal in the interior of the eye?

The proper course was to use the magnet in all cases as

soon as possible after the injury. The more attraction power the magnet had, the better, for with a rheostat the amount of pull could be accurately controlled. Although it was sometimes very difficult and, according to some authorities, impossible to extract a fragment of metal weighing one-thirty-second of a grain or less, nevertheless attempts should be made.

If the metallic body had entered the eye through the cornea, no matter where it stopped, whether in the uvea, lens or vitreous, an attempt should be made to draw it forward into the anterior chamber and then remove through the original opening or else through a corneal incision. If the body should rest posterior to the lens and could not be drawn forward into the anterior chamber, then a scleral incision at a site nearest the metal could be made and an attempt at extraction with the magnet tried. If the particle had penetrated the eye through the sclera and lay posterior to the lens, then its removal should be made through the original wound of entrance, and no effort to draw it forward around the lens into the anterior chamber should be attempted. The opening in the sclera through which the metal passed into the eye might possibly have to be enlarged to permit of its withdrawal. If all attempts at extraction failed, then the eye should be removed, as an eye which contained a foreign body was ultimately lost.

Finally, each case of metallic bodies within the eye must be studied individually, as no single method of procedure would apply in all cases.

Dr. Welton related a case, the interesting features of which were: 1. That the patient was not absolutely sure that anything had even struck the eye. This showed that no reliance could be placed on the statement of patients as to whether or not a foreign body had penetrated the eye. 2. That the exact localization by means of an X-ray picture was absolutely needed in this case, and this should always be determined in every case of a metallic foreign body in the eye before any attempts at removal had been made. 3. That in all cases where it was suspected that a metallic foreign body was in the eye, the magnetic properties of such tools should be determined before any attempts were made at removal. 4. A remarkable thing in the case was that though the metal passed

through the lens, except for a slight line of opacity along the path of the foreign body, it remained perfectly transparent. 5. The case showed further that the removal of foreign metallic bodies was in some cases impossible except through a scleral incision, and that good results were obtained by this method, even though it was contrary to the teachings of Haab.

Discussion.—Dr. H. W. Woodruff had had a similar experience to the one related by Dr. Welton, in which the foreign body penetrated the iris and the lens, and was removed a few hours after the injury through the original opening. The lens did not become opaque. Reports of such injuries were made where the lens had been penetrated, and yet no cataract had been produced. He had seen experiments performed on rabbits' eyes in which the needle was plunged into the eye and opacity of the lens produced in the path of the needle slightly around it, and then cleared up again in a few days.

He called attention to an accident that happened sometimes in removing steel through the corneal wound: the piece of steel would lie behind the iris, and the entire iris would come out with the foreign body. It was proper to do an iridectomy where there was liability to such an accident. He spoke of a case where a large piece of steel weighing five grains entered the eye through the ciliary region. He saw the case a short time after the injury and removed the piece of steel through the original opening with some difficulty, but it was necessary to enlarge the opening before it could be taken out, owing to the size of the piece of steel. This patient made an uneventful recovery with absolutely no inflammatory signs whatever.

Dr. W. Franklin Coleman spoke of the relative merits of the large and small magnets in extracting pieces of steel or other foreign bodies from the eye.

Dr. A. C. Bartholomew, of Van Wert, Ohio, said that, according to the statement of a well known electrical engineer, the ophthalmologist could not get a better result or a stronger pull with a giant magnet than from a small magnet.

Dr. J. P. Worrell, Terre Haute, Indiana, recalled an instance in which a very small piece of iron entered the lens. It did not cause any swelling of the lens, yet slowly the lens became opaque. Later perhaps, if the patient had returned at the proper time, he might have extracted the lens.

As to opacity of the lens clearing up, he mentioned the case of a young man whose eye was struck with a pin in which the cornea and iris and the lens were perforated. He had a small radiating opacity within a few hours following the injury. When seen the next day he had a very large triangular opacity in the posterior fornix. This ultimately cleared up and his eye became normal.

Dr. Major H. Worthington said that a foreign body in the eye was sometimes overlooked by the general practitioner who first saw the case. He recalled the case of a sheet metal worker, who while punching holes in galvanized iron felt something strike his right eye, although there was no pain. At first he went to a general practitioner, who examined the eye and told him there was nothing in it. He gave him boracic acid and told him to wear a patch over the eye, which he did for the first week. Dr. Worthington saw the patient two weeks later, at which time he was having pain. The eye was red, pupil irregularly contracted and there was some ciliary tenderness. The lens was clear. Under a mydriatic the fundus could be seen and the foreign body located in the vitreous. A skiagraph was made and the foreign body located and extracted through the scleral incision. The result was 20/40 vision with his correction for hyperopic astigmatism. When he came to the speaker his vision was 20/30 minus 1 with glasses, and in the delay of two days in deciding about having an operation done his vision dropped to fingers at two feet. There was opacity in the vitreous. How long was it safe to allow a foreign body to remain in the eye?

Dr. Clark W. Hawley said, as to the length of time a foreign body might be allowed to remain in the eye, it would depend entirely upon the aseptic condition of the foreign body when it entered the eye. He recalled the case of a patient, eighteen years ago, where the foreign body had entered the eye and was not known to be in the eye at all. The second day after the injury the man went back to his work. Eight months thereafter the patient presented himself with a dilated pupil and wanted Dr. Hawley to reduce it. Vision in this eye was slightly reduced. There was no irritation about the eye. Upon looking into the eye he saw a piece of steel about the size of an ordinary pinhead. He showed the case at the time before the ophthalmological society, and men of considerable

experience said that if the piece of steel was removed the man would lose his eye. He, with the assistance of Dr. Starkey, opened the eye in the same manner that had been described, made a conjunctival flap, took a cataract knife and made an incision, and extracted a piece of steel with a small magnet. The piece of steel was in this man's eye eight months unknown to the patient or anybody. It entered at the sclero-corneal junction. The result of the operation was the man had 20/20 vision.

Dr. C. G. Darling said in the removal of a particle of steel through the scleral incision, sometimes it became entangled in the choroid or in the edge of the sclera or in the conjunctiva, and Dr. Wilder in one of his cases had made and used a little speculum, the blades of which are five millimeters long, with very fine, short, sharp pointed pins. An incision was made in the conjunctiva quite a distance from where the scleral incision was made, a few millimeters long, and the speculum introduced into the conjunctival incision. When the incision was made in the sclera the speculum was introduced into the scleral incision. The points on the speculum were only about a millimeter and a half or a millimeter in length, so that they did not enter the eye but held the edges of the sclera apart. By means of this small speculum the wound could be kept open to facilitate the removal of the foreign body.

Dr. William A. Mann stated that sometimes a foreign body penetrated and lodged in the posterior wall of the sclera. The magnet would not touch it if it penetrated the sclera. He had had several such cases, and in only one of them was the eyeball removed and the foreign body removed in that way. Some foreign bodies would lodge in the back of the eyeball, and in such cases an X-ray was of advantage in locating them before the use of the magnet to extract them.

Parinaud's Conjunctivitis.

Dr. A. C. Bartholomew reported the case of Miss T., aged thirteen years, who was referred to him on February 14, 1914, by her family physician, with the following history:

"She first consulted him (the family physician) one week previously, complaining of a lump on the upper lid which scratched the eyeball. The eyelid drooped and there was some discharge in the corner of the eye. There was a piece

of tissue projecting below the upper lid, and this he grasped with a pair of forceps and pulled away. He did not notice the condition of the glands. The patient was suffering from yellow jaundice at the time."

When seen by Dr. Bartholomew the left upper lid was swollen and drooping, and a slight discharge was collected at the inner canthus. On everting the lid it showed a raw, bleeding, hypertrophied surface involving the inner margin of the turned cartilage. The preauricular lymphatic gland was enlarged to the size of a small walnut and was tender to palpation. There was no fluctuation. One gland just below the ear was also involved, and there was a slight ciliary congestion probably from irritation of the cornea.

The other eye was not involved. Under two per cent silver nitrate applications every other day and the use of a collyrium at home, the condition cleared up rapidly and patient was dismissed March 26, 1914.

Dr. Bartholomew also reported a case of unsuspected sarcoma of the eyeball.

Discussion.—Dr. W. H. Woodruff had had two cases of Parinaud's conjunctivitis. One of them was a mild case in a young woman. She recovered in a few weeks. The infection was comparatively mild. She had the typical characteristic conjunctiva with enlargement of the glands to a slight degree. She recovered with very little treatment.

The second case was in a boy, eight or nine years of age. The termination in that case was very unusual. He had considerable enlargement of the glands. The family physician opened a number of these glands, but they did not contain any pus. There was nothing but clear serous fluid in them. There were no organisms discovered at any time in the secretion of the glands. The eye recovered. He removed some granulations after a time because they were so large. The swelling or hypertrophy diminished and the eye returned to normal, but about six months later the boy died. The first week he declined rapidly, and then died without any other diagnosis than Parinaud's conjunctivitis having been made.

Cicatricial Ectropion of the Upper and Lower Lids.

Dr. J. P. Worrell, Terre Haute, Indiana, read a paper on this subject.

The patient, a man, fifty-four years of age, in an attempt

to rescue his wife from burning gas, was severely burned on the hands and face, losing most of his fingers and suffering such injury to the face that the contraction incident to the cicatrization resulted in complete ectropion of all the eyelids.

The patient came under treatment seven months after the accident and presented the following conditions: Below the level of the outer canthus the parts were lined and seamed and so adherent to the underlying tissues that little mobility was preserved. This condition was much aggravated by an injudicious attempt to correct the deformity, made soon after the wounds had healed, as was evidenced by the heavy cicatricial lines. The forehead and upper part of temporal region was smooth, the burn having destroyed the superficial layers of the skin. The right eyebrow was wanting, and the outer third of the left. The upper lids were everted, the tarsus curved on itself and thickened, the eyelid rolling out when the patient looked downward. Cul-de-sac preserved. The lower lids were stretched downward, obliterating the cul-de-sac. The conjunctival surface was red, somewhat rough and lying in the plane of the skin below. The tarsus was adherent to the underlying tissues. The lid margin was indicated simply by the line of transition from the mucous membrane to the skin and the presence of a few cilia. The conditions in the right were aggravated by the displacement downward and outward of the outer canthus, including the external palpebral ligament.

Correction of the deformity was made by a series of operations, running over a period of several months. Each operation was limited to one lid, inasmuch as the operation was necessarily a tedious one, and it was impracticable to prolong the anesthesia. The method employed was the use of sliding flaps, supplemented by Thiersch and Wolfe grafts. In restoring the lids proper the principle of removing the new cicatricial area as far from the lid margins as possible, as emphasized by Hotz, was followed, such modification of his method being made as the exigencies of the case demanded.

The final result was most gratifying, restoring the lids to their normal position with preservation of their function. From a cosmetic standpoint it was fairly satisfactory.

After the restoration of the lids to their place the condition of the cornea greatly improved so that the iris could be seen

throughout its entire circle. The anterior chamber deep, showing that what was thought to be an adherent leucoma was but hypertrophy of the epithelium in the attempt of nature to preserve the eye against the evil effects of exposure. Behind the clearest portion of the cornea iridectomies were subsequently made, giving vision by which ordinary newspaper type could be read.

The diversity of condition afforded an opportunity for the trial of various methods of covering the raw area so that the comparative merits of flaps and the various forms of grafts could be advantageously studied. Thiersch and Wolfe grafts played a larger part in the correction of the trouble than did sliding flaps. Of these the Thiersch graft gave good results, "taking" easily, and was followed by little or no contraction of the underlying tissues. The chief trouble with Wolfe grafts is their marked disposition to contract. However, where it is necessary to "fill in," they furnish a means of building up lacking parts that make them indispensable. The effect of their contraction can be avoided in a large degree by making them of ample size, and in exercising great care in their preparation, avoiding traction, and reducing their manipulation to the minimum.

The dressing consisted of an extremely thin layer of absorbent cotton wet in normal saline solution, over which was placed a dry pad of cotton covered with some impervious material, the whole being swathed in gauze and bandages to secure quietude of the parts and maintain equable temperature.

Discussion.—Dr. A. Bulson agreed with Dr. Worrell in regard to the merits of the Thiersch and Wolfe grafts. The Thiersch graft was much better because it was more flexible. On the other hand, the speaker believed that a properly trimmed Wolfe graft would oftentimes give a quicker and more satisfactory result than a Thiersch graft. Attention was called to the value of scarlet salve in bringing about epidermization where the grafts failed to cover the entire surface, where there were eyelets of raw tissue, and where the Wolfe or Thiersch graft had not taken. He had seen excellent results in such cases by keeping these areas covered with salve which was so highly recommended by skin men.

Regular meeting held November 16, 1914. Dr. Wesley Hamilton Peck, the president, in the chair.

The Intracapsular Cataract Operation.

Dr. William A. Fisher reported and exhibited ten cases on which he had performed this operation. He also referred to the method he had recommended to the society last March and published in *Ophthalmology*, April, 1914.

The ten patients with twelve operations presented were not selected cases, but ten consecutive operations, and with them were two juveniles, operated upon May 16, 1914. All had been operated upon recently, none longer than three months ago except the double one. He presented the two juveniles, on one patient, operated May 16th, because it was unusual in America to operate both eyes at the same time. Juvenile cataracts were not choice cases for the intracapsular operation, and his needle was used more often in those cases than in senile cataracts. The younger the subject the more difficult it was to rupture the zonula, hence, the frequent use of his needle in aiding the delivery of the lens. No loss of vitreous occurred in any of the cases when the needle was used. To present twelve operations, one-half of them being juvenile, seemed to him a severe test for the intracapsular operation. In one of the twelve operations slight inflammation followed, probably caused by prolapse of the iris, but the patient was discharged with a vision of 20/30. This was the only case that had had any pain or received any after-treatment. Any operation that would remove the cataract and not be followed by inflammation would usually give good results, and if the capsule was removed with the lens without loss of vitreous, postoperative inflammation would be rare. If an operator could successfully remove the lens in its capsule, the intracapsular operation would give the best average vision. Twelve operations, even though they be consecutive, were not numerous enough to form a definite conclusion, but it was a large number to get together at any given meeting in this city.

In all of these twelve cases the bandage was not removed from either eye until the ninth day, and slight inflammation followed only one, and that was the one with a prolapsed iris. He felt quite confident of a good result when he removed the lens in its capsule, because then he considered it useless or

even meddlesome to remove the bandage from both eyes for nine days unless the patient complained. If the patient did not complain for nine days, one might assume all was well, and when the first dressing was removed the only treatment necessary was dark glasses.

To do justice to Colonel Smith and his operation, he wanted to emphasize two of the so-called objections so often brought forward by good operators who had not adopted his method: First, the absence of drawn up pupils, especially those that interfered with vision; second, the absence of astigmatism from the corneal section which had been made in all of those where only one out of the twelve had any astigmatism. He felt sure he never operated on twelve consecutive cases by the old method without having some complications more serious than had occurred in these twelve, and he was sure he could never have obtained such good vision as had been obtained in this series by any other method than the intra-capsular.

Before he reported the results of those twelve operations he wished to emphasize the importance of the Smith technic in any method of removing the lens. This could be mastered by good operators by adhering strictly to it in doing the old operation with the exception of cutting the capsule. If good operators would master the Smith technic in the old operation, they would soon find themselves doing many intra-capsular operations.

Discussion.—Dr. Oliver O. Tydings had examined several of the cases exhibited by Dr. Fisher and could confirm what Dr. Fisher had said with reference to visual acuity. He did not think any member of the society, who had been doing cataract extraction for any length of time, had ever operated on so many consecutive cases with so little astigmatism as was shown in these cases. Absolute freedom from inflammatory conditions should commend this operation to the attention of the public. He believed sooner or later this operation would supersede all other operative efforts for the relief of cataract.

Dr. Charles H. Francis asked Dr. Fisher if in these cases he bandaged both eyes for nine days.

Dr. Harry S. Gradle said it was his good fortune to go over forty-five cases of Smith extraction with Professor Elschnig in the eye clinic at Prague, and he compared these

with three hundred cases of extraction within the capsule, and there was no greater astigmatism following the Smith operation than that following the capsulotomy method. Smith operated on both eyes at once.

Dr. Willis O. Nance asked Dr. Fisher if he considered it absolutely essential to the success of the operation to keep the eye bandaged for nine days. Personally, he felt such a procedure was not good surgery. In one case in which the bandage was left on for seven or eight days, the cornea was found to be quite necrotic. Panophthalmitis had resulted, and since that time, in every operative case, he had examined the eye at the end of the first forty-eight hours. There were three objections to the operation described. The first was the position of the corneal incision, it being much more in the cornea than the one employed when one expected to make a large conjunctival flap. Second, the possible loss of vitreous. Third, bandaging the eye for nine days without opening the bandage to see what condition the eye was in.

Dr. Fisher, in closing, said there was not one of the twelve patients exhibited who had experienced the slightest trouble on account of the bandage being left on for nine days, and the patients were here to speak for themselves. When the bandage was taken off there was no after-treatment except in one which had a prolapsed iris.

As to the incision, it was always finished in the cornea, and no attempt was ever made to make a conjunctival flap. Puncture and counter puncture was made just as deep as the anatomy would permit.

Loss of vitreous was possible, but it did not occur in any of these cases. The number of cases where vitreous was lost would decrease as the operator mastered his technic. In one of these cases both eyes were operated upon at the same time. He operated upon both eyes at the same time in a hundred and seventy-two of his five hundred and seventy-six operations in India, and in these there was no complication that contraindicated the procedure in double cataract. It was common practice in India, as far as he knew, to operate upon both eyes at the same time. In one of the cases he presented, one eye was operated upon, and both eyes were bandaged for nine days. The eyes had been free from the bandage for five days, and tomorrow he would have the second oper-

ation and go through the same procedure. If he had operated upon both eyes at the same time two weeks ago, the patient would now be ready to go home. The objections to operating upon both eyes at the same time would disappear as the objections to the intracapsular operation would surely disappear.

Intranasal Operation for Dacryocystitis.

Dr. Frank E. Brawley reported the case of a woman, fifty years of age, who had dacryocystitis of nearly a year's standing. Local treatment for several weeks was without avail. The dacryocystitis was controlled by syringing, but it was impossible to pass a probe through the nasal duct. Two weeks ago last Thursday he did intranasal opening of the tear sac, dissecting up the mucoperiosteum for about a centimeter square and the anterior attachment of the middle turbinate. Instead of using the chisel method of West, he made use of a cutting bur such as was used in mastoid operations. This bur was made of the proper length to reach the area. He cut through with this long bur very quickly, enlarged the bone opening up and down and sideways, and there was no cutting into the tear sac at all. Today there were slight evidences of reaction, some thickening at the margin of the bony wound, but tear drainage was perfect.

Discussion.—Dr. Joseph C. Beck had operated on four cases of dacryocystitis by a method a little different from the one described by Dr. Brawley. The last case was a boy, six years of age, who had had chronic dacryocystitis since he was a year old. There was no benefit from the usual treatment. Patient had ulcerative rhinitis in infancy. The naris was very small. It was now two weeks since the operation was done, and it was too early to judge whether the opening was going to remain patent.

Dr. J. Sheldon Clark, Freeport, Illinois, said in cases where the bone was heavy or thick the bur would be of some advantage, but where one had thinner bone to deal with the chisel would serve the purpose nicely, and in such cases he had had no trouble in using that instrument.

Dr. Oliver O. Tydings said it was more satisfactory to the operator and more comfortable to the patient to use the bur whenever it was possible to do so.

Dr. Michael Goldenburg saw a number of cases last sum-

mer that had been operated on by different men, and some of them had been under treatment for nine months after the operation. He examined the noses of some of these patients and found pus flowing freely over the middle turbinate and going on through the middle meatus. He failed to see the advantage of the intranasal operation over the external operation. The advocates of the intranasal operation claimed that the only advantage was it did not leave an external scar.

Dr. Oliver O. Tydings stated that some years ago he operated on a case of forty years' standing. There was no reason why there should be a constant flow of pus if the opening was made at the bottom of the canal and drained. There would be free drainage and one would get rid of pus.

Dr. Willis O. Nance asked Dr. Goldenburg as to the result in the cases he had seen relative to the relief of the epiphora.

Dr. Goldenburg said he was in Killian's clinic and saw two patients, one of whom was having trouble all the time from epiphora.

Dr. Harry S. Gradle saw half a dozen cases that were operated on by West in Hirschberg's clinic, and in these the epiphora was relieved and the tear passage restored.

Dr. Brawley stated that some of the cases mentioned by Dr. Goldenburg might be explained on the ground of ethmoidal infection, and they had not been properly handled. There might be cases in which there was considerable necrosis in the lacrimal fossa, but with the bur operation, if there was necrosis and soft bone, it would be asy to remove it, so that we would not expect to have a chronic discharge.

Cavernous Sinus Thrombosis and the Future.

Dr. Henry Glover Langworthy, Dubuque, Iowa, stated that the study of cavernous sinus thrombosis had been limited in the past. First, because the cases were rare and the average physician in a lifetime would scarcely see more than two or three sufferers with the disease. Second, being surgically less approachable perhaps than almost any other structure in the body, few men even today really considered the sinus available for surgical interference, especially when the patient might seem already in a septic moribund condition and the cavernous sinus itself only one of a number involved.

After speaking of the symptoms, the author stated that in

making the diagnosis of a given case even without previous experience, one might formulate this rule: When there was increasing exophthalmos and lid edema on the same side as a somewhat distant infecting focus, any edema of the face and neck, septic temperature, and the slightest evidence of beginning lid edema or exophthalmos of the opposite eye, we were safe in saying that the later positive symptoms of cavernous sinus thrombosis were present beyond a doubt. A fairly early diagnosis in cases where the infection originated posteriorly about the ear or back of the neck was comparatively easy and should present no difficulty.

The prognosis was bad, and the mortality ninety-nine per cent. For all working purposes the mortality under present conditions should be considered one hundred per cent.

As possible operative routes to attack the sinus or methods of treating the same, the following were mentioned as still to be perfected: Mosher's proposed anterior route through the orbit, Hartley-Krause Gasserian ganglion route through the side of the skull, the Luc-Langworthy route upward through one side of the nose and sphenoidal cavity, and lastly in certain otitic cases energetic treatment of the original focus alone from behind—namely, by opening the lateral sinus and jugular bulb thoroughly and resecting the internal jugular vein.

If we were to progress in the treatment of so baffling a disease, the author said we must rigidly adhere to three cardinal points connected with it: First, standing flat footed upon a reasonably positive diagnosis as early in the disease as possible. Second, viewing the sinus as we would any other large vessel which had become thrombotic. Third, following routinely that operative path which seemed to the surgeon in charge as best fitted for drainage.

At the present time, and looking fearlessly into the future, it would seem wise until more evidence to the contrary was produced to look upon these cases with increasing hopefulness and as offering surgical opportunities which should not be ignored.

Dr. Albert E. Halstead had seen a number of cases of thrombosis of the cavernous sinus, most of them the result of trauma. Two cases were the result of gunshot wounds. One was a gunshot wound of the ear in which the bullet passed

through the middle ear, struck the greater wing of the sphenoid after penetrating the ganglion and lodged in the sinus cavity. Another was a gunshot wound of the temporal region in which the sinus was injured and patient developed sinus thrombosis. At first, patient lost one eye, then the other, and finally recovered after both eyes had been removed. The patient with a gunshot wound of the ear lived for about two weeks. He developed what the speaker supposed to be, in addition to sinus thrombosis, brain abscess. He operated because of the brain abscess, and not because of the sinus thrombosis. He exposed the sinus easily by the usual route used in reaching the Gasserian ganglion and was able to scrape out all the sinus and remove the bullet, which was lodged in the sphenoid bone, but the patient died of meningitis. He had had meningitis before operation, but the speaker was not aware of the extent of it. He had had two cases, besides these two of gunshot wounds, that got well without operation, which demonstrated to him conclusively that patients with thrombosis of the cavernous sinus might recover spontaneously.

Dr. Joseph C. Beck spoke of a method which he had developed of reaching the hypophysis by way of the antrum, following the Henson operation, and had operated successfully on two cases of hypophyseal tumor of the glandular region. One patient recovered his vision; the other had since died from progressive sarcoma which began in the hypophysis, and the greater part of the tumor was found in the cerebral portion.

Dr. John R. Fletcher stated that as soon as he saw Dr. Kanavel operate on the living for tumor of the hypophysis, he went to the dead house and undertook the same operation upon the dead, and found the route through the nose on the dead subject not very difficult. There he had no difficulty with hemorrhage, which was likely to occur in the living subject. Since then he had done the operation several times upon the cadaver, and had also followed the route referred to by Dr. Beck in reaching the hypophysis. In the first operation he did, following that of Dr. Kanavel's on the living, he not only went through the nose but through the Gasserian ganglion region, and was able to demonstrate that case. The specimen was shown several years ago before the Chicago Medical Society.

Dr. Langworthy, in closing, said it would seem that some cases of thrombosis of the cavernous sinus were amenable to surgical treatment, while others were not. The operator must decide that question for himself.

The Ocular Manifestations of Diseases of the Nasal Accessory Sinuses.

Dr. Richard J. Tivnen read a paper on this subject, which was illustrated by stereopticon views showing the anatomic relations of the structures discussed.

In a consideration of the ocular manifestations of nasal accessory sinuses, of prime importance was the anatomic relation of these cavities to the ocular structures. This relation was a very intimate one, and suggested at once a great likelihood of extension of pathologic processes from such closely allied structures. Apart from this close anatomic relation, ocular manifestations, occurring in common with sinus disease, had been explained by many varied theories. These comprised in the main as their basic principle disturbed drainage from the sinus with its attendant interference with physiologic function and the varied circulatory manifestations which such processes entailed. The disturbance to ocular structures consequent upon sinus disease practically might include every tissue and structure of the eye and orbit. In the lids, causing redness and edema; in the muscles, weakness, paresis, disturbance of accommodation; in the globe, ex- or enophthalmos of various types; in the orbit, abscess, cellulitis; in the uveal tract, iritis, iridocyclitis, uveitis, etc.; in the optic nerve, neuroretinitis; in the choroid and retina, chorioretinitis, etc.; in the cornea, keratitis and abscess.

The symptomatology was influenced by the location, extent and severity of the particular process, and ranged from slight asthenopic symptoms, such as blurring on use of the eyes, to absolute blindness.

The essayist at this point exhibited stereopticon slides showing the intimate anatomic relation of the sinuses to the orbit and ocular structures.

Many eye cases of this class were labeled hypochondriacs, and their distressing complaints were considered imaginary or greatly exaggerated. A more careful study of this type of case would disclose that many of them were afflicted with

sinus disease, with secondary ocular manifestations. Apart from the specific pathology of the individual structure involved, there was quite commonly present in such cases a toxemia, which might manifest itself in such vague symptoms as depression, lassitude, inability to concentrate, etc. The conspicuous rôle played by certain structures, notably the tonsil and teeth, in the production of general systemic infections was nowadays well recognized. Guided by these experiences and keeping constantly in mind the exceeding vulnerability of these neighboring structures, the relative frequency of sinus involvement, and the fact that often these involvements did not frankly disclose themselves, the intimate anatomic relation of the structures would frequently serve to direct the attention of the ophthalmologist to these parts as possible focal points in many obscure ocular lesions.

In summarizing, the author felt the following conclusions were warranted:

1. Interrogating the nasal accessory sinuses in all disturbances of the eye and orbit of an obscure nature.

2. Obtaining a clear history of the ocular manifestations, regarding such symptoms as frequent head colds, headaches, etc., associated with the outbreaks of the ocular trouble, as suggestive of sinus complications.

3. Cooperation in all obscure eye cases with the rhinologist, the otologist and oral surgeon. The value of such team work could not be overestimated.

4. A careful ocular examination, particularly the examination of the fields of vision for form and color.

An Unusual Form of Persistent Capsulopupillary Membrane.

Dr. L. E. Barnes reported this case. The patient, H. D., was thirteen years of age. Erysipelas at three weeks of age following a scalding burn; mushroom poisoning at five years of age. Patient's history and family history negative. Both eyes, normal externally, anterior chambers normal, and pupils dilate well under atropin.

Right eye.—Underneath the anterior capsule in the pupillary area, in a horizontal line, were three punctate opacities of the lens. In the upper nasal quadrant was a subcapsular opacity, irregular in outline, two millimeters in diameter and one-half millimeter deep. From the upper inner edge ran a broad flat

band of opacity. First it went directly back, then downward and back, terminating in a point just in front of the posterior capsule. This opacity was irregular in outline and seemed to have a central zone of opaque tissue surrounded by flocculent opacities. The rest of the lens was normal in size and shape. The edge of the lens did not appear to be nicked like a coloboma. The opacity did not interfere with central vision. The fundus was normal. The eye was hyperopic 1.50 D.

The left eye was similar to the right, only there was an additional opacity that appeared to encircle the nucleus of the lens. The irregular opaque fibers were more fibrillar than in the right eye, with less surrounding corneal opacities. The ophthalmic literature at the author's command for the last five years contained no reports of a similar embryologic case.

PAUL GUILFORD,
Secretary.

COLORADO OPHTHALMOLOGICAL SOCIETY.

Meeting of October 10, 1914. Dr. D. A. Strickler presiding.

Penetrating Injuries of the Eyeball.

Dr. W. C. Bane presented a young man whose left eye had been struck on September 10, 1914, by a dead branch of a tree. The cornea had been perforated just below the center, producing a vertical cut three millimeters in length. The point of the branch had also penetrated the lens, and had cut the lower margin of the iris.

On September 12th the vision of this eye was fingers in the lower part of the field of vision at twelve inches. The lens had become opaque, and there had been slight tenderness of the eyeball during the second week after the injury. During the second week and part of the third the anterior chamber was over half full of cortical material. Treatment had consisted of atropin and dionin locally, with pressure bandage; and internally ten grains of aspirin four times daily. Much of the lens had been absorbed, and there were now good light perception and projection.

Dr. Bane also presented a young man who, on June 8, 1914, while striking a screwdriver the metal of which was exposed in the end of the handle, had been struck by something in the left eye. At the time he had supposed the fragment to be from some hard brick on which he was working. When seen two hours after the injury there was a small cut in the palpebral conjunctiva of the lower lid, and ecchymosis of the eyeball down and in, but no evidence of a break in the ocular conjunctiva. The vision of the left eye was then 5/30. On the fourth day vision had risen to 5/10. On the eighth day there was some cyclitis with vitreous haze. By the twenty-second day the inflammation had subsided and vision was 5/5. On the fiftieth day vision began to fail again, and by the sixty-first day it had fallen to 5/20 plus. There had been no eye- or headache, the vitreous was clear, and the eyeball was free from congestion. The pupil measured seven millimeters in diameter. In the lower part of the fundus was a gray black

mass surrounded by whitish tissue. A test with the sideroscope gave positive evidence of the eye containing metal, and an X-ray picture located a foreign body measuring seven by one millimeter, situated seventeen and one-half millimeters back of the center of the cornea, ten millimeters below the horizontal plane and seven millimeters to the nasal side of the vertical plane. On July 14th the foreign body was removed with the magnet through a scleral incision between the internal and inferior recti. Five weeks after removal the vision was 5/5. The pupil had become almost as small as that of the other eye.

Discussion.—Dr. Black believed that the X-ray should be used more frequently, when there was a partial history or a possibility of a foreign body having penetrated into the eyeball.

Dr. Walker thought that if a Haab magnet were used the foreign body should not be drawn into the wound, on account of the risk of traumatism, although the magnet might be applied through the wound of entrance if this were in the scleral tissue.

Retinal Atrophy.

Dr. Melville Black presented a woman of forty-six years who, three years previously, had had a general enlargement of the lymphatic glands with sore throat, and six months later had begun to notice blurred spots in the visual field. After a further interval of six months night blindness developed, and also photophobia and flashes of light before the eyes. The vision in each eye was 20/20. In the left visual field there was an almost complete scotoma around the fixation point. It was not now possible to map out any other blind area. The patient stated that Dr. Würdemann had diagnosed the condition as atrophy of the retina.

Discussion.—Dr. Jackson thought that retinal atrophy was possibly the anatomic basis of the ocular symptoms. It would be advisable to take the blood pressure.

Advancement of Superior Rectus.

Dr. F. R. Spencer presented a woman who, after tenotomy of the right superior rectus muscle thirteen months previously, had suffered from diplopia, with which were associated nau-

sea, vertigo, and rarely vomiting. In distant vision the right eye was about four degrees lower than the left, and she was unable to elevate the right eye without having diplopia.

With a plus 1.75 sph. right vision was improved to 15/20 minus, and with a minus 1.00 sph. combined with minus 0.75 cyl. axis 170 degrees left vision was improved to 15/10 minus. The fundi were negative with the exception of slight arteriosclerosis of the retinal vessels.

Advancement of the right superior rectus was performed under cocain anesthesia, Worth's musculocapsular advancement being used and overcorrection of about three degrees made. At the present time she had orthophoria and was perfectly comfortable.

Polycythemia.

Dr. Edward Jackson presented a woman of forty years who was under the care of her general physician for polycythemia. Her blood count showed 9,500,000 red cells. Hemoglobin was 110 per cent. The conjunctival veins were enlarged. The retinal veins were large and very dark, but not tortuous. The arteries were normal, but looked light by contrast. Five disc diameters above the right disc, near a branch of the superior nasal vein, was a small spot with indefinite edges. There were similar spots down and out from each macula. The largest spot was smaller in diameter than the largest retinal veins. There were no hemorrhages.

Retrochoroidal Hemorrhage.

Dr. Edward Jackson presented a man of sixty-three years, who in August last had been struck on the outer edge of the left orbit by a heavy board. Since the accident there had been no vision in the left eye, which had, however, shown no other sign of injury. There was no reaction of either pupil to light thrown into the left eye. The margin of the pupil was generally adherent, and there was a film of deposit on the lens capsule. The anterior vitreous was clear, and the fundus, seen somewhat indistinctly through a posterior haze, showed choroidal vessels. The tension of the eyes was: Right, thirty-two; left, six millimeters. A probable diagnosis of retrochoroidal hemorrhage was suggested, with a possibility of sarcoma of the choroid.

Sarcoma of the Choroid.

Dr. E. R. Neeper had seen a man of seventy-one years who, after the last of three separate injuries to the right frontal bone, had noticed a dark spot in front of the right eye, with lowered vision more recently. The temporal half of this eye would not transilluminate, and the ophthalmoscope showed through clear media a mass of detached retina occupying about one-fifth of the vitreous chamber at about axis 135 degrees. The retinal area showed no folds or convolutions such as are often apparent in detached retina. The base of the iris, from about 120 to 150 degrees, during the next month underwent a degeneration simulating amyloid, there being chain-like areas looking much like globules of fat; and during the same period the lens became entirely cataractous. Enucleation was advised but rejected. Two months after the eye was first seen it was enucleated, and the growth found to be carcinoma of the ciliary processes.

Trephine Operation for Glaucoma.

Dr. Melville Black reported a case of bilateral subacute glaucoma, in which the tension of the right eye had been forty-six, and of the left eighty millimeters of mercury. The Elliot trephine operation had been performed on each eye, combined with iridectomy. The tension of the right eye fell almost at once, but the tension of the left eye, as tested with the fingers, came down more gradually. Ten days after operation the tension as measured with the Schiötz tonometer was: Right, nine; left, thirteen millimeters, although the eyes did not feel so soft as this to touch.

Corneal Leucoma With Calcareous Degeneration.

Dr. E. R. Neeper reported a case of bilateral corneal leucoma in which the patient had come complaining of irritation in the left eye. Examination showed the surface epithelium to have been rubbed off a small part of the left leucoma, and the denuded area was found on close examination to be occupied by a small hard body. On removal this proved to be a calcareous deposit, measuring about one and one-fourth by two and one-half millimeters. There was no appreciable increase in vision after the operation.

Orbital Cellulitis From Frontal Sinusitis.

Dr. D. A. Strickler presented a youth of sixteen years, who had come on account of proptosis and diplopia, with severe ocular pain and swelling of the upper lid. The temperature was raised, and there were other symptoms of sepsis. A deep incision of the upper and inner angle of the orbit did not produce any pus. A few days later suppuration of the anterior and posterior ethmoid cells was diagnosed and drainage attempted. After another three days all the symptoms were much exaggerated, and there was fluctuation at the upper outer angle of the orbit.

Free incision under general anesthesia gave vent to abundant thick creamy pus, and was followed by relief of the acute symptoms. The discharge from the orbit continuing, and X-ray examination showing involvement of the frontal, ethmoidal, and maxillary sinuses, a complete Killian operation was done by Dr. Levy. An opening was found in the floor of the frontal sinus, leading into the orbital abscess; thus showing the frontal sinus disease to have given rise to the orbital cellulitis.

Meeting of November 21, 1914. Dr. H. R. Stilwill presiding.

Corneoscleral Trephining.

Dr. E. T. Boyd presented a man whose left eye had been trephined on December 12th on account of repeated attacks of a glaucomatous character. No history of iridocyclitis could be obtained, and the tension was sixty-six millimeters of Hg. Although apparently first-class drainage was being had through the trephine hole, and iridectomy had been done, the tension was now forty-nine millimeters. Before the operation the patient had barely light perception, and about three days after the operation he could count fingers at four or five feet. There was a deposit on the anterior lens capsule.

Discussion.—Dr. Patterson thought the condition secondary to iridocyclitis, but regarded the trephine operation as the best thing for this eye.

Dr. Matson had treated the patient some time back for iridocyclitis in this eye, but had not seen him recently. Tension was somewhat increased with the original attack.

Congenital Fistula of the Lacrimal Sac.

Dr. E. T. Boyd presented a case of congenital fistula of the right lacrimal sac, in a man of about twenty-one years. There had been no discharge from the sac with the exception of a small amount of clear lacrimal fluid. The passage had been almost closed by the actual cautery, the use of which would be repeated if the leakage continued.

Dr. Matson had a case of tiny fistula just opposite the upper punctum in a woman of thirty years. It would admit only a slender probe. What should be done for this?

Discussion.—Dr. Jackson would cauterize freely in Dr. Matson's case, going to the bottom of the passage.

Dr. Patterson would open the passage first and then cauterize.

Vossius' Lens Ring.

Dr. J. R. Robinson presented a man of twenty-three years, whose left eye had been injured on December 13, 1914, by a glancing blow from a broken drill punch. The patient's physician had at once instilled atropin, and the pupil was fully dilated when the patient came to Dr. Robinson on December 16th. At that time there was a small clot of blood in the outer angle of the anterior chamber, and the man gave a history of having had only light perception for about forty-eight hours. The eye was said to have possessed normal vision before the accident. On the anterior surface of the lens, in a position corresponding to that of a moderately contracted pupil, was a very delicate ring, only seen upon close examination with the ophthalmoscope. There was also a thicker line of pigmented deposit near the lower margin of the dilated pupil. (Dr. Robinson reports later that the ring had entirely disappeared by November 28, 1914.)

Discussion.—Dr. Ringle thought the ring was a pigment deposit resulting from the impact of the iris on the lens capsule.

Dr. Strader remarked that in the case shown by him in March, 1914, there had been three or four pigment spots at the center of the ring, which could hardly be accounted for by the idea that they were pigment from the iris.

Dr. Jackson stated that experimental work which had been done on this subject seemed to indicate that the opacity was

inside the lens capsule, being really in the epithelium and the superficial fibers. It was possible that the hemorrhage which had been seen in the anterior chamber had come from a laceration of the iris which was now concealed by the dilatation of the pupil.

Dr. Patterson did not believe there was any deposit of pigment, and regarded the ring as being due to a change in refraction of the lens fibers.

Ciliary Spasm Simulating Myopia.

Dr. C. A. Ringle reported the case of a young woman of seventeen years with a decidedly myopic history, and who had come for treatment for an apparent myopia. Distant vision was decidedly below normal. Under complete cycloplegia, the eyes proved emmetropic or slightly hyperopic, and the vision was practically normal. After recovery from the cycloplegic, best vision was obtained only by use of a — 0.75 lens. It was suggested that the eyes were just passing over into myopia.

Discussion.—Dr. Libby, regarding the case as one of ciliary spasm, suggested keeping the patient under atropin for some weeks without the use of any lens.

Dr. Bane thought the patient would have to be watched for some time before a proper opinion could be formed as to the nature of the trouble.

Retinal Arteriosclerosis.

Dr. Edward Jackson reported briefly two cases illustrating the changes in the retinal vessels due to high blood pressure. One of these patients, aged sixty-two years, came with no impairment of vision, but with the retinal veins obscured and narrowed where they were crossed by the arteries, and somewhat kinked. His blood pressure, which a year previously was said to have been one hundred and sixty, was now two hundred and ten millimeters. The other patient, a man of thirty years, had suffered from headache, but showed a fundus which was normal except for some small corkscrew twigs on the retinal vessels between the disc and the macula. The veins appeared normal where crossed by the arteries. His blood pressure proved to be one hundred and thirty-five milli-

meters. Dr. Jackson had not been able to make up his mind that corkscrew vessels were an important sign of increased blood pressure. While in the East recently, he had come across Gunn's original contribution on this subject to the Ophthalmological Society of the United Kingdom, which he read. This paper was published in 1892, and was only a page in length. (A reprint of this paper will appear in a paper by Dr. Jackson on retinal angiosclerosis, to be published in the ANNALS OF OPHTHALMOLOGY.)

Discussion.—Dr. Patterson said that he saw corkscrew vessels, especially towards the macula, in young people and others, which were absolutely physiologic. Dr. Patterson also referred to the case of a woman of forty-seven years who, in spite of marked changes in the retinal vessels and a blood pressure of 260 millimeters two years ago, was now, after changing her mode of living, apparently in very much better health. Some extravasations which she had had in the fundus two years ago were now almost impossible to trace.

Dr. Jackson observed that the more cases of this kind were recognized early, the more of them there would be who lived a long time after recognition, or recovered entirely. He had seen a patient who was under the late Dr. Stevens some years ago on account of arteriosclerosis affecting the eyes, but who now played golf every day instead of sitting in his office, and whose vessels had shown very little further change.

Tobacco Amblyopia at Sixty-three Years.

Dr. J. A. Patterson reported the case of a man of sixty-three years, who had come in August on account of poor reading vision. His corrected distant vision was $4/12$ most in each eye. Although a hunchback, his health had always been good, and he had never before had any trouble with his eyes. The temporal side of each nerve was a trifle pale. After an absolute central scotoma had been discovered in the field of each eye, the patient confessed to continual smoking since the death of his wife, less than a year ago. Under abstinence from tobacco and the use of turkish baths, iodids, and later strychnin, the vision of the right eye reached $6/6$, and that of the left $6/9$; but the central scotoma persisted when the patient was last seen, in September.

The particularly unusual feature of this case was the age of the patient, tobacco amblyopia being most frequent between forty and fifty years of age. It was also noteworthy that this patient had not used any alcohol.

Pupillary Inequality With Syphilis.

Dr. G. F. Libby reported the case of a man of forty years, in whom syphilis had been diagnosed the previous June, the Wassermann reaction being positive. Salvarsan had been administered five times, and mercury was now being given. There had recently been intermittent headache for three weeks, ocular fatigue and conjunctival hyperemia. The patient was worried and depressed, and a previously existing deafness had increased. The media were clear and the fundus normal except that the discs were hyperemic and the retinal vessels rather tortuous, the veins being distended. Correction of 3 D. of compound myopic astigmatism in the right eye and 0.62 D. of compound hyperopic astigmatism in the left eye, gave normal vision and relieved the headache and asthenopia. There were six degrees of esophoria for distance, ten degrees for near, and one-half degree of left hyperphoria. The noteworthy point in the case was that in ordinary daylight the right pupil was three millimeters in diameter, and the left two and one-half millimeters; although under full cycloplegia the right pupil dilated only to six millimeters, while the left widened to seven millimeters. After the effect of the cycloplegic had passed, the pupils returned to the same size as before, the right being one-half millimeter larger than the other.

Dr. Libby had noted this pupillary phenomenon several times in observations covering many years, but was not prepared to state in what proportion of these cases syphilis was present.

WM. H. CRISP,
Secretary.

WILLS HOSPITAL OPHTHALMIC SOCIETY.

Stated Meeting, Monday Afternoon, May 4, 1914. Dr. S. Lewis Ziegler, chairman.

Tubercular Keratoiritis—Increased Tension, Pain, Contracted Fields of Vision.

Dr. S. D. Risley presented a sturdy Italian fruit dealer, aged fifty-one years, who had been referred to his clinic at the Wills Hospital in February, 1914, with painful eyes, marked impairment of vision and contracted fields. O. D., V. = 6/15 field contracted to 15 degrees and nearly concentrically. The fundus was fluffy, and details blurred; no cupping could be determined. The anterior ciliary vessels were dilated, but did not present the appearance of a chronic inflammatory glaucoma. O. S., V. = 3/22, and field contracted to a small area around fixation point. Tension 52. The man suffered greatly from pain in the eye and left side of head and occiput. The cornea was not steamy; the pupil was not dilated, but contracted under eserin; the nerve was deeply cupped.

He was admitted to the hospital March 14, 1914, and placed on hot stupes locally, and magnesium sulphate internally. Two days later, March 16th, a broad peripheral iridectomy was done on the left eye, and was followed by complete relief from pain. The wound closed promptly, but the convalescence was slow, the eye remaining red and uncomfortable, and the wound pouting. The tension sank to 15, but occasionally rose to 30 or even 32 mm.

On March 25th, one week after the iridectomy, a small nodule appeared on the iris below the coloboma; and several gray dots, on the posterior surface of the cornea, near the angle of the anterior chamber. The von Pirquet test was markedly positive, and produced a rise of temperature and local reaction in both eyes. This was followed, in a few days, by improvement in the ocular conditions and general health. The tension in both eyes fell to normal, the discomfort and injection disappeared, and the fundus cleared.

Dr. Risley called attention to the fact that notwithstanding no operation had been done on the right eye, the fundus

cleared, the tension fell to normal, and the field and central vision improved under the general régime and the tuberculin injections. He thought that the original ocular infection was doubtless in the uveal tract, the tubercle on the iris and the deposits on the posterior surface of the cornea at the angle coming later; and that the products of uveal inflammation had blocked the excretory channels and produced the increase of tension and the glaucomatous sequelæ. He said that he had presented the case as an interesting illustration of the clinical history and pathologic significance of uveal disease in the production of increased tension of the eyeball. The increased tension, he regarded as a sequel to the uveal disease due, in the case presented, to tubercular infection.

Pituitary Tumors.

Dr. T. H. Weisenburg (by invitation) said that the pituitary body is made up of two lobes, an anterior and a posterior. The anterior is the glandular part. It is supposed that the pituitary secretes a substance which gets into the cerebrospinal fluid, and exerts its influence in that way. A lesion of the pituitary body causes two sets of symptoms: one, the result of involvement of the pituitary; and the other, the result of pressure on the neighboring structures.

The first symptom of pituitary disease would be due to involvement of the optic chiasm, since the gland lies in the sella turcica, the upper outer temporal field usually being first involved. The color field is disturbed first. This is not unusual. A brain tumor exerting intracranial pressure will do likewise.

After color and form fields go, the macula is implicated. Here, also, color goes first, and form afterwards. Then follows loss of the nasal field, as well as the temporal. The second symptom is optic atrophy. This is primary, and not secondary to choked disc.

If you examine a patient and find bitemporal hemianopsia or complete loss of vision, the question is whether to operate or not; and whether, if you do operate and remove the tumor, a return of vision will occur. In many cases you do get this, in spite of seemingly complete blindness. The reason is that the loss of vision is due to the fact that there is complete blocking of impulses from the periphery to the primary visual

centers, and not to degeneration of the optic nerve fibers. One should base the decision in regard to operation, not on loss of vision, but on the degree of optic atrophy.

The other symptoms are those which result from pressure on the cranial nerves and other structures. Pressure on the olfactory nerve gives loss of smell; on the oculomotor nerve, ptosis and involvement of the muscles of the eyeball. If there is pressure on the uncinate lobe, there occur peculiar convulsions, first described by Hughlings Jackson—the so-called uncinate form of fit. Dr. Weisenburg had had such a patient several years ago, on whom Dr. Frazier had operated. When standing up or walking, he would suddenly begin to smack his lips and smell a peculiar odor. He could not describe this odor, but said that it was different from anything else. He also tasted something that he described as metallic. Then he would fall in a fit. He had uncinate convulsions, due to irritation of the uncinate lobe, which is associated with the center of smell and taste.

If the tumor still increases, it presses on the cerebral peduncle. The foot of the peduncle transmits motor fibers chiefly.

Recapitulating, Dr. Weisenburg said that the first symptoms are visual, embracing involvement of the color perception in the upper outer part of the visual field, followed by loss of form perception. The second symptom is optic atrophy; the third, oculomotor palsy; and the fourth, uncinate disturbances.

The best way in which to diagnose a pituitary tumor, he continued, is by the X-ray. He then exhibited three sets of X-ray plates taken by Dr. Pfahler. In one the patient had the following group of symptoms: There was, first, loss of menstruation, followed by drowsiness and headache. Ophthalmoscopic examination demonstrated loss of the upper outer part of the visual field. The diagnosis of pituitary tumor was then made. The tumor was not in the sella turcica, but above, as could be made out clearly from the plate.

In contrast, Dr. Weisenburg showed a second case, in which the tumor was very large, and was located within the sella turcica, there being absorption of that part. He then referred to the work of Cushing, who makes the following arbitrary differentiation of the glandular symptoms: There may be (1) increase of excretion, or hyperpituitarism; (2) loss of

secretion, or hypopituitarism; (3) a combination of loss and increase, which is really what occurs in most cases. If there is an increase of secretion, there may be overgrowth of tissue. If this occurs in a young person, there results gigantism. Dr. Weisenburg showed a patient of that type before one of our societies during the past winter. The boy was sixteen years old, and was six feet, seven and a half inches in height. Besides, he was formed like a woman, and the genital organs were undeveloped. When this condition occurs in an elderly person, in whom the epiphyses have ossified, acromegaly results. If there is a loss of secretion, or hypopituitarism, in a young person, there is lack of growth, with fatty deposits all over the body, and infantile sexualism or a hypoplasia of the sexual organs. Besides, there is increased tolerance for carbohydrates. In an old person with hypopituitarism, if a woman, there may be loss of menstruation, fatty deposits and increased tolerance for carbohydrates, in addition to the focal symptoms. The majority of cases, however, combine both factors. Personally, Dr. Weisenburg had never seen a clearcut case of either hyper- or hypopituitarism, but always a combination of both.

A Case of Hypophysis Disease.

Dr. J. Milton Griscom and Dr. E. H. Goodman reported the following case of hypophysis disease: The patient, Francis W., white, aged ten years, had applied to the Eye Dispensary of the Pennsylvania Hospital, under the service of Dr. James Thorington, on December 7, 1912. He complained of poor vision with headaches, extending over a period of several years, with some aggravation of these symptoms during the past few months. Vision, at the time of this first visit, equaled: C. D., 20/40; O. S., 20/40. With S. plus 0.75, O. D. equaled 20/20; and with S. plus 1.00, O. S. equaled 20/20. Externally, the eyes were negative, and the eyegrounds showed no pathologic changes, aside from a congested retina and some overfulness of the vessels. The visual fields showed a marked concentric contraction for both form and color. In order that the case might be studied more thoroughly, the patient was admitted to the medical ward, and the following history obtained:

Francis W., born February 22, 1902, aged twelve years; admitted, April 23, 1914. The patient has always been sick.

Has had typhoid fever, chicken pox, pneumonia, scarlet fever, measles, whooping cough, nervous prostration (one year old) and nerve exhaustion. Never had any injury to head.

Was a tall baby when born, but was not fat. Weight, nine pounds. Began to walk when two years old (late), but his mother had to carry him until he was nine. Was always sick; and when he became sick, had to be carried, as he then lost all power in his limbs. Mother seems to think he was bright as a baby (eight months old baby).

Patient went to school at eight years. Could not go before, as he was always sick. Schooling was continually interrupted by illness. Has been going to school irregularly for a year. Is in grade 3 B. Should be in sixth grade at twelve years.

Can read and spell all right. Cannot write well. No good at mathematics. Does not play with other children. Is always tired. Has no energy. No appetite lately, but ordinarily has a voracious appetite.

Is melancholy at times, on account of mother scolding him. Is disagreeable to sister. Father scolds him because he is not bright.

Is much bigger than boys of his own age. Stronger than most boys (doubtful). Has headaches all the time, in forehead and in both eyes. Sleeps poorly; but at times sleeps all the time.

Father is said to be bright. Is a patrol driver, and weighs 250 pounds. All patient's family big.

Large boy, adipose type. Ears prominent; head large. Eyes throughout, negative.

Measurements are all increased for a boy of his age.

Penis, rudimentary. Left testicle down in scrotum.

Weight, 118½ pounds. Average weight, 81.6 pounds for that age. A boy of fifteen and one-half years weighs 118½. Height, 4 feet 11¾ inches.

There is increased tolerance for levulose, two hundred grams being assimilated without producing levulosuria. No polyuria.

The case was diagnosed as one of hypopituitarism.

Discussion on Papers of Dr. Weisenburg and Drs. Griscom and Goodman.—Dr. William Zentmayer said that all were very much indebted to Dr. Weisenburg for his lucid explanation of this peculiar symptom complex, and that there were some

points in the symptomatology he would like to speak of. One was that while the typical field defect is bitemporal hemianopsia, this is not always found. Homonymous hemianopsia is not rare in pituitary disease. Another eye symptom is the presence of a central scotoma.

Regarding the effect of the tumor on the nerve paths and the checking of conduction, Dr. Zentmayer said that he had had under observation for nineteen years a woman with bitemporal hemianopsia. For twelve years she had shown no change in her vision. At first, she had had hemianopsia for color only. She had then developed it for form. Subsequently, she ran on for twelve years with no change whatever. There was no atrophy; but there was always present a slight blurring of the nasal border of the disc and overfulness of the veins.

Fifteen years after he had first seen her, a change came over her fields. The field began to increase toward the temporal side. Eighteen years after the first symptom had developed, she suddenly gained almost a full field. Of course, it was a contracted field; but it had an extent of fifteen or twenty degrees on the nasal side, as well as on the temporal. She died soon after this, and no opportunity was afforded to make a postmortem examination. She had very pronounced acromegalic symptoms.

With regard to the other symptoms, Dr. Zentmayer said that he had seen a case in which the acromegaly was very incipient. The fields showed some contraction of the upper and outer part. The man was forty-five years old. Dr. Zentmayer had known him when he was younger, and he was then very handsome. When seen after an interval of ten or twelve years, Dr. Zentmayer found quite a change in his face. The patient himself had not noticed it, and neither had his wife, they having become gradually accustomed to the change. There was also a little grayness of the optic nerve. The patient likewise had a symptom that could not be explained as a direct symptom of the disease—a weakness of accommodation. An X-ray picture was taken, without the radiographer's having any idea that the existence of a tumor was suspected. The man was radiographed for the purpose of detecting sinus trouble; but the report was that if a tumor of the pituitary was suspected to exist, this was probably the correct diagnosis.

The case showed very clearly what Dr. Weisenburg had pointed out about the fields.

Regarding tumors of the uncinate, Dr. Zentmayer said that he had then under observation a man fifty-eight years of age, with no ocular changes whatever, yet with marked uncinate symptoms. He would lose consciousness while sitting at the table; and, after two or three minutes, would wake up again. His family could notice that he did not know anything that was going on during the interval of unconsciousness. The man has a large business, which he attends to regularly and well, except when he gets these lapses of consciousness. At such times, however, he will transact a piece of business, forgetting afterwards that he has done so. He has peculiar lip movements, and he has also taken on a peculiar levity.

Dr. William C. Posey said that one of the first cases of this kind that he had had an opportunity to study in private practice was in a lady who had lost the sight of her left eye because of pressure on the optic chiasm, and had temporal hemianopsia in the right eye. Her most marked symptom was a diminution in the light sense, due to involvement of the macular fibers in the right optic nerve, a symptom to which Dr. Weisenburg had called attention.

Dr. Posey thought that the most interesting thing in this connection that had come out within the last year was concerning the treatment of this affection. The questions to be asked were, "What are you going to advise?" and "Is it safe to recommend an operation when the vision is still good, or not?" Dr. Weisenburg had said that the prognosis for the restoration of vision is good, even though it be very low, provided that there is not a great deal of optic atrophy. Dr. Posey agreed with this view, but considered it difficult to say how much atrophy there is in retrobulbar cases. He cited the case of a young medical man in this city, who was absolutely blind in one eye for a year or more, yet was operated on by Dr. Cushing and had restoration of vision in the blind eye. Dr. Posey had been rather chary about recommending an operation, either by Cushing's or by Frazier's method, because of the risk of failure, and because of the danger to the life of the patient.

Cilia in the Anterior Chamber.

Dr. Dewey reported a case of cilia in the anterior chamber, in a patient from Dr. Zentmayer's clinic, eight years old, who had come to the hospital on the 25th of the preceding March, giving a history of having had a hair blow into his left eye while he was getting his hair cut, four years before, and stating that the hair was still there. The vision was 6/6 in the right eye, and 6/9 in the left. There was a small cicatrix on the cornea of the latter eye, with a cilium fixed in it at one end, and apparently going right behind the iris, and between the iris and the lens, up and out. The distal end projected diagonally across the anterior chamber.

The boy had complained of considerable pain for four days prior to reporting at the clinic. There was, besides the slight cicatrix on the cornea, a very slight opacity of the lens; but this was rather hard to detect. There was no sign of irritation, and the eye was white and quiet.

Dr. Dewey referred to Collins and Mayou, who state that giant cells, similar to those found in tubercles, are apt to form around cilia implanted in the eye, and that they are probably derived from the endothelium of the blood and lymph vessels and have a phagocytic function.

These authors also state that if the root sheath of the hair is carried into the eye with it, the cells composing the root sheath proliferate and form a funnel (?) like epithelial tumor or cystic growth, lined with laminated epithelium. When the growth is cystic, the entire anterior chamber may become completely lined with epithelium, obstructing the exit of intra-ocular fluids and producing a glaucoma.

There was no cystic growth here, and no formation of any kind around the hair; but the boy was positive of the pain in the eye. There was no difference in the refraction, and no reason why one eye should have a lower amount of vision than the other, except the slight opacity on the lens. Dr. Dewey thought that probably Mayou's explanation of the formation of an epithelial lining might apply to this case, because there was a wound of the cornea, and it might have proliferated through the wound. He believed that the boy had a slight attack of glaucoma.

Discussion.—Dr. Ziegler was sorry that the patient of Dr. Dewey was not present, because such conditions are rare. He

recalled that during his residentship at Wills Hospital there had been three patients of the kind, whose cases are reported by Dr. Harlan in the first volume of the report. The first patient was an Italian, who had been baling hay or straw, and had been struck on the brow by the end of a piece of wire. While there was no wound of the brow or lid, there had been a puncture of the cornea; and four cilia were found in the anterior chamber. Two of them protruded through a fistulous opening in the cornea. Cataract occurred, and the man came to the clinic one morning on account of a peculiarly severe pain every time he shut his eyes. Dr. Ziegler extracted the two cilia that projected through the fistulous opening in the cornea, and then turned the patient over to Dr. Harlan in the afternoon. A few days later a case of the same sort occurred in the service of Dr. Oliver, and then one in Dr. Risley's service.

In the first case an iridectomy was done within a few months, the lens *débris* being removed, together with the two remaining cilia. There were no signs of proliferation about the hair bulbs. They had been there for a number of months, and there was a chance for proliferation to have taken place, but none had occurred.

The case that occurred in Dr. Oliver's clinic was in a farmer, who also was baling hay and was struck by the end of a wire. In Dr. Risley's case the accident had occurred in a blacksmith's shop, where a hot nail had struck the patient's eye.

Dr. Zentmayer said that the interest of Dr. Dewey's case would lie in seeing the patient. A mistake in the diagnosis would be almost excusable, because of the resemblance of the condition to retained pupillary membrane. It was only by watching the contraction of the iris and the synchronous movement of the free end of the hair that the diagnosis could be made. In the absence of a history that could be depended on, the diagnosis was difficult. Dr. Zentmayer mentioned another form of implantation cyst that occurs in connection with these cilia, which causes a separation of the layers of the iris, as the result of the introduction of the hair into the stroma.

Dr. Picard related a similar case in Dr. Fisher's clinic. It occurred in a young woman who, while in a butcher's shop, was struck in the eye by a part of a splinter of bone. Dr. Fisher did a curettement, and later did a second. After the

second operation he saw the cilia free in the anterior chamber. The patient has been under observation for five years or longer. The hair has never caused any irritation. She comes in twice a year for examination. She never has any pain, although the cilia can be seen moving very freely.

A Case of Disciform Keratitis.

Dr. William Zentmayer reported a case of probable disciform keratitis. It was wanting in many characteristics of that condition, but was an interesting and rare corneal affection. The man first came in a month ago, with some inflammation of the eye and the ordinary accompanying symptoms. There was a slight haze in the central part of the cornea, but the most prominent lesions were the opacities underneath the epithelium, between the central opacity and the periphery. These were small (1 mm. to $\frac{1}{2}$ mm. in diameter) and greenish. The case resembled very much Fuchs' superficial punctate keratitis. As the case got better, so far as the inflammation was concerned, the central opacity became denser and took a disc-like form, but it had not the sharply defined margin that Fuchs describes. Later writers have not found the peripheral margin so dense as he described it to be at first, and have detected branching striæ permeating the stroma at the cornea. Subsequent cases have shown, very often, associated with the disciform opacity, blood vessels in the stroma. These cases are the same as the cold abscesses of the earlier writers, according to Fuchs. The infection is so mild that the cornea is able to resist it, and prevent suppuration and open ulcer. Rarely is there a break in the epithelium. This view has not been sustained by others. Peters, particularly, and Verhoeff have contended that the condition is a neuropathic one; but Moeller had the opportunity of studying an eye that had been the seat of disciform inflammation, and he confirms the view of Fuchs that it is a low grade infective process.

Dr. Posey said that some years ago he had reported two cases of disciform inflammation of the cornea, more or less typical, with a sharply defined margin. While he did not think that Dr. Zentmayer's case was that at this time, he believed that it might develop into it. He stated that in his opinion the cases that he has observed, among which are several of atypical form, originated in injury of the central epi-

thelial tissues. He believed that a neuropathic element might play an important part, but considered it to be, in the first place, trouble coming from without.

Report of an Unusual Case of Congenital Cataract.

Dr. William Campbell Posey referred to a child of seven months, totally blind and with both lenses cataractous, upon whose right eye he had recently operated by discission. Although the capsule of the lens had not appeared thickened in the examination by oblique light made previous to the operation, he had experienced great difficulty in introducing the knife needle through the capsule, the lens mass receding before the knife, and becoming indented like a small cyst. Perforating into the interior of the lens was not followed by the escape of lens matter into the anterior chamber; nor, when a second attempt at needling was made, two weeks later, was there any evidence that the first procedure had had any effect upon the cataract. The second attempt was largely a repetition of the first, and had an equally negative result. After the lapse of another two weeks, the anterior chamber was opened with a keratome, and an effort made to drag out the lens mass in the capsule by means of forceps; but this procedure was only partially successful, as the major portion of the now hardened lens matter remained in situ. Dr. Posey stated that two months had elapsed since the last operation, but the pupil was still blocked. He purposes to make a fourth attempt to clear the still partially blocked pupil.

An Unusual Case of Puerperal Blindness.

Dr. Posey gave the notes of the case of a woman, thirty-three years of age, a primipara, who had lost her sight during the eight months of pregnancy, in consequence of renal complications, vision in each eye being reduced to counting fingers at half a meter. The ophthalmoscopic findings were very striking, the picture being that of extreme edema of both retinæ, which were immensely thickened by the edema and were extensively detached below. The blood vessels were much dilated, very tortuous and flame-shaped, and round hemorrhages surrounded the discs. Cesarean section was performed by Dr. Hirst, and the patient was safely delivered of a healthy baby. Vigorous depleting measures were adopted,

and vision rapidly rose as the edema disappeared. The patient was able to leave the hospital a month after labor was induced, with vision in the right eye equaling 5/40, and in the left eye, 5/60. A severe neuritis still persists in each eye, Dr. Posey stated; but numerous small heaps of pigment alone give evidence of the previous retinitis.

The speaker then referred to the importance of ophthalmoscopic examination in all cases of pregnancy in which any form of toxemia is threatened, and mentioned several cases that he had previously reported, in which marked ophthalmoscopic changes were present without albumin being found in the urine—a faulty action of the liver being, in all probability, the cause of the toxemia.

Case of Secondary Glaucoma.

Dr. Zentmayer said that he had had under observation for five years a case of secondary glaucoma. The eye had a very high tension, and there was a very deep anterior chamber, with a hazy cornea and very slight injection. The point of interest was the extremely high tension, with scarcely any pain. A few days before, Dr. Zentmayer had trephined the globe. Although the patient had been under observation for five years, he had not before felt it wise to operate; but since the development of bulbous keratitis he considered that some operation was called for. He had never felt safe in doing any other operation than trephining. Just before the operation the tension was sixty. A peripheral iridectomy, with the trephining, was also made. The keratitis has since improved decidedly. There remains simply a haze, whereas at first there were large vesicles. The tension has become minus, and in Dr. Zentmayer's opinion the light perception is better than it was. In the other eye there was a very considerable pathologic excavation, which had not changed in the five years that he had been under observation.

Meeting of October 5, 1914. Dr. S. Lewis Ziegler in the chair.

Gonorrheal Ophthalmia.

Dr. S. D. Risley exhibited a patient convalescing from a violent attack of gonorrheal ophthalmia, which he said was the only case occurring in his service for many years. The

patient had first applied with a catarrhal conjunctivitis, which simulated, because of the retrotarsal swelling and viscid discharge, the early acute stage of trachoma; but laboratory study showed only streptococci and a few pneumococci. A thorough application of silver nitrate at the clinic, and an alkaline wash and zinc sulphate at home, led to a speedy recovery.

A few days later the patient returned with swollen lids, a profuse discharge and an edematous collar embedding the entire limbus of the cornea. He had severe pain. Laboratory study revealed an abundance of gonococci. He was admitted to the isolation ward, and placed on continuous iced compresses, frequent thorough cleansing and strong solutions of silver nitrate to the everted lids and retrotarsal folds.

The pain continued. In forty-eight hours the cornea was infiltrated and the anterior chamber apparently filled with pus. The ball was hard, swollen and extremely tender to palpation. The cornea ruptured, and a hopeless prognosis was given.

The conjunctival sac was then filled with a ten per cent ointment of cassaripe, i. e., the expressed juice of the black cassava, the base of the West Indian pepper-pot, used by the natives to preserve meat. The pain and suppuration subsided with great rapidity, the swelling of the lids disappeared, and convalescence was rapid. The site of the corneal rupture, to the nasal side of the pole, became closed, showing a contracting scar and adherent iris when the patient was exhibited by Dr. Risley. Elsewhere the anterior chamber was reformed. The ball was nearly free from injection, but discolored from the conjunctival infiltration. The man could count fingers readily. Such a recovery from what had appeared at one stage to be a hopeless condition was, in Dr. Risley's experience with gonorrheal ophthalmia, remarkable. For a study of the cassaripe ointment, he referred to his paper presented to the American Ophthalmological Society in July, 1898.

Discussion.—Dr. John Turner asked Dr. Risley how long the ointment would keep.

Dr. Risley replied that if Dr. Turner would open the box, he would find the salve in good condition.

Dr. William Zentmayer spoke of the uncertainty of labora-

tory diagnosis of gonococcal conjunctivitis, and said that the most competent bacteriologists acknowledge that they are not always able to make such a diagnosis. He then cited a case in a child on whom he had operated. Two days later there was a discharge from the conjunctival sac, and a collection of necrotic material about the field of operation, with some swelling of the lids. The discharge was grayish. It was not profuse, but free. From a smear of this discharge a laboratory diagnosis of gonococcal conjunctivitis was made. The next day the condition was worse, but not clinically characteristic. The case was sent to the Philadelphia General Hospital, where several examinations were made; yet the gonococcus was not discovered. This should not be considered an adverse criticism upon the laboratory in which the first examination was made, because Dr. Zentmayer knew of three instances in which such a diagnosis had been made, in none of which did the case prove to be gonococcal. These three examinations were made in three different laboratories. One of these patients had become perfectly well within forty-eight hours. Dr. Zentmayer said that he would defy anyone to distinguish the gonococcus from the staphylococcus morphologically, as pictured in Axenfeld's textbook. One, however, is Gram negative, and the other Gram positive.

Dr. William C. Posey asked Dr. Zentmayer whether he had considered the possibility of any of these cases having been metastatic, and said that one could find the gonococcus in smears from the eyes in such cases, even though they might run a moderate course.

Dr. Zentmayer replied that metastatic cases are usually bilateral, while infective cases are unilateral.

Dr. Risley stated that in his case it was improbable that the condition was metastatic, because it was confined to one eye. The patient had never had gonorrhea himself, but he ascribed the infection to the use of a contaminated towel.

Pulsating Exophthalmos.

Dr. William Campbell Posey exhibited a case of pulsating exophthalmos involving both eyes, in a man sixty-six years of age. This condition had arisen after a fall upon the head, and was supposed to be associated with a fracture of the base of the skull, although an X-ray plate, taken two years after

the injury, was negative. Vision began to fail shortly after the accident, and gradually decreased until that of the left eye was finally equal only to counting fingers at twelve inches, that of the right eye being 1/60. The ophthalmoscope revealed the visual diminution to be dependent upon a low grade atrophy of both optic nerves. The retinal veins were still much distended and tortuous, but no signs of present or past neuritis could be seen when the case was exhibited. There were no hemorrhages. Both eyes were moderately proptosed, apparently in consequence of a distention of the orbital veins, for a mass of these vessels was easily palpable immediately under the orbital rim. This mass of vessels pulsated and conveyed a thrill to the examining finger. Both eyes were practically immobile. The right superior oblique, the right internal rectus, and possibly the inferior oblique and the left superior oblique, alone functionated. Dr. Posey said that the case had been referred to the Howard Hospital for neurologic and surgical study, and that it was the intention of Dr. Edward Martin, the surgeon of that institution, to ligate the carotid.

Examination of the nervous system by Dr. John H. W. Rhein resulted as follows: There was no facial paralysis observable. The tongue was pushed slightly to the right. The finger to nose test showed marked hypermetry and dysmetry on both sides. Adiadochokinesis was present in the left arm and both legs. With his feet together, there was a tendency to sway and stagger backwards. Walking showed a side-stepping to the left. The knee jerks were increased on both sides and were equal. Ankle clonus and Babinski phenomena were both absent. There was no paralysis of the arms or legs. There was a marked irregular tremor of both hands. The symptoms were considered to indicate an involvement of the cerebellum, probably in the nature of a destructive lesion occasioned at the time of the fracture of the skull, two years previous.

Brain Tumor With Choked Disc.

Dr. Posey then showed a case of brain tumor with choked disc. This condition had arisen in a nonsyphilitic man, thirty-one years of age, a patternmaker by trade, three years previously, without apparent cause. Vision had begun to fail in the left eye four months before; and in the right, two months

later. Total blindness had ensued in both eyes several weeks before the patient came for examination.

Externally there was nothing unusual, except widely dilated pupils, the ocular movements being good, and there being no proptosis. Ophthalmoscopic examination revealed a high degree (5 to 6 D.) of papillitis in each eye, with dilatation of the blood vessels, hemorrhages and extravasations. This case, too, had been referred to the Howard Hospital, and Dr. Posey said that it was Dr. Martin's intention to perform an immediate decompression operation.

Dr. J. H. W. Rhein, the neurologist at the Howard Hospital, reported the family history in this case negative, except that the patient's mother had had several still-born children and miscarriages. His previous history was also unimportant, aside from the fact that since his eleventh year he had had attacks that, from the description, appeared to have been petit mal. For the last six weeks he had had occipital headaches, associated with pain in the frontal and vertical region, vomiting in the morning and vertigo, objective and subjective.

Upon examination, the following condition was found: The neck was stiff, offering some resistance to rotary movements; the right side of the mouth drooped when he made an effort to show his teeth, and the tongue was slightly pushed to the right. Slight hypalgesia was present on the right side of the face. There was no weakness of the arms or legs, no tremor and no adiadochokinesis. The right knee jerk was slight, and the left absent; but both were reinforcible. There was no clonus nor Babinski sign. Dr. Rhein thought that the symptoms pointed to a diagnosis of cerebellopontine angle tumor, showing involvement of the fifth, seventh and twelfth cranial nerves.

Extensive Injury to Both Eyes From a Dynamite Explosion.

Dr. Posey exhibited a patient in whom the left eye had been torn away entirely, and the right so badly lacerated that vision was reduced to light perception. When first seen, some weeks after the accident, the conjunctiva had covered the lower half of the cornea and was adherent to a dense scar, which extended across the cornea. The lens was cataractous. The eyeball was entirely exposed by a complete entropion of the lower lid, the lid being folded back and held in its ectasic position by a broad fold of cicatricial tissue. Four operations

were necessary: First, the lid was restored to its normal position by cutting away the adhesions and transplanting a broad pedicled flap from the forehead, to fill in the gap left between the lid and the brow. A month later the cataract was needled and the lens afterward removed by the curette. A second needling obtained a clear pupil. Vision being still low, on account of the corneal scar blocking the greater part of the pupil, an iridectomy was made, the sphincter of the iris being incised in such a way that the upper margin of the pupil was brought to within a few millimeters of the corneal margin. The corrected vision, at the time of the exhibition of the patient before the society, was equal to $5/15$, and the patient could read newspaper type without difficulty.

New Growth Affecting Left Optic Nerve and Fibers of the Right.

Dr. P. N. K. Schwenk spoke of a patient whom he had examined and found with an entirely normal fundus and a vision of $6/5$ in each eye with a plus $1\frac{1}{2}$ D. glass. A month later, she complained of pain in the left eye, with which she could not see well. She was then found to require a 3 D. glass in the left eye, in order to give $6/5$ vision; and the same glass was also needed for the right eye, giving the same amount of vision. There was beginning swelling of the left disc, $2\frac{1}{2}$ D. Dr. Schwenk notified the family physician of the patient's condition, and they conducted further examinations together. The urine was negative. Two weeks before the meeting there was also beginning swelling of the left disc, of about 2 D. This had increased to 6, and the right eye had 5 D. of swelling. The patient still retained $6/5$ vision, but required a slightly stronger glass in each eye. The fields had just been taken, and showed a limitation for white. The red and blue fields were interlacing. The patient did not have any localized symptoms other than what could be seen in the fundus. Dr. Schwenk thought that there was probably a new growth, affecting the greater part of the left optic nerve and the anterior parts of the fibers of the right.

Discussion.—Dr. John B. Turner asked whether an X-ray had been taken of the case, stating that Dr. Schwenk had shown a case in which a brain tumor had been diagnosed from the X-ray. A decompression operation was done in this case, and the tumor was not found; but there was every symptom of brain tumor.

Dr. Rhein replied that an X-ray had been taken, but that it showed practically nothing. There was no filling of the sinuses whatever.

Dr. Zentmayer asked whether Dr. Rhein meant the sphenoid sinus, and Dr. Rhein replied that he had referred to the cerebral sinuses.

The Result of an Advancement of the External Rectus, After the Method of O'Connor.

Dr. William Zentmayer said that before he described the operation he would like Dr. Schwenk to show the result.

Dr. Schwenk exhibited the patient, and stated that he had had a divergence of fifty to sixty degrees. Dr. O'Connor had come to the hospital personally and performed the operation, with the result that the patient had nearly parallel fixation. The internal rectus was advanced without cutting the external rectus muscle. It was thought, at the time, that the operation would probably have to be done on each eye; but the result was so good that it was decided to let the case alone until it was seen what the final result would be.

Dr. Zentmayer said that the eye operated on by Dr. O'Connor for him at the same time that Dr. Schwenk's case was done was one with convergent squint of twenty degrees. The immediate results showed only ten degrees of correction; but later the amount of squint was lowered, and the result was very good—better than any that Dr. Zentmayer had seen obtained from a single advancement without tenotomy. While a good muscle attachment could be secured by the Worth method, the speaker considered the rest of that procedure as faulty as any of the other modifications of the advancement operation, the weak point in this operation being the scleral attachment of the advanced muscle. For this reason, Dr. O'Connor had been anxious to discover some method of shortening the muscle without having the inserted sutures under any strain whatever. He was led to devise this method by having seen the cowboys on the prairie shorten their surcingle by drawing them up between two loops of another strap. He shortened the muscle in the same way.

The first step in the operation was to lay bare the tendon of the muscle, dissecting it clearly and sharply. It was then loosened with a strabismus hook passed under it. With a hook

a narrow band of the tendinous fibers was separated from the upper margin—about $1\frac{1}{2}$ to 2 mm. The same was done below. Dr. O'Connor then made an incision, turning back a central flap of the muscle out of the way, and leaving nothing but the two narrow bands of the tendon lying on the sclera. He next took a piece of Lukens' No. 4, twenty-day catgut, and made a loop beneath one tendinous strip. The next step was to pass the two ends of the suture over the muscle, and then through the loop. He then drew upon these two ends, to bring the loop into position. The strain from the loop of catgut was transferred to the tendinous strips, when the catgut was pulled upon, shortening them very considerably. He also did the same thing below. In order to avoid the hump that would be formed by tying this catgut again, he took a piece of fine 00 catgut, and tied it around the base. He then did the same thing below. When he laid the tongue of muscle down in position again, the considerable amount of shortening obtained could be distinctly seen. This tongue was then advanced by using a single suture. The next step of the operation was to cover the muscle with a fold of conjunctiva and put in a stitch. He did not tenotomize the opposing muscle, because, as he had performed the operation only a few times, he wanted to give it a severe test. The sutures not being under any strain, the patient was allowed to go with only one eye bandaged. Dr. Zentmayer stated that Dr. O'Connor uses for this operation No. 2, No. 3 or No. 4 gut. With the latter he expects to get twenty degrees of shortening.

Discussion.—Dr. Posey asked how much muscle was cut off.

Dr. Zentmayer replied that none was cut off. He then stated that he had just received a letter from Dr. O'Connor, in which he had tried to explain why the immediate result had been so slight in the operation that he had performed at the Wills Hospital. He thought that he might have paralyzed the muscle fibers at the time of the operation by using a clamp on them; and that these muscle fibers had gradually recovered their tone when released from the clamp. He said that in future he would put a suture in, instead of using the clamp.

Dr. Zentmayer added that the catgut must be moistened, but must not be too moist; because this would cause it to swell and make it difficult to tie.

A Case of Lupus of the Eyelid Treated With a Thiersch Graft.

Dr. McCluney Radcliffe presented this case because he considered it one of unusual interest. The patient had been referred to the hospital by Dr. F. J. Walter and Dr. C. C. Bahannon, of Daytona Beach, Florida. Several years ago he had been treated for a small growth on the right cheek, which was apparently cured by means of a plaster. In August, 1913, he noticed an ulcer at the inner canthus of the left eye, which was treated by cauterization and the X-ray for six months, but without improvement. Dr. Bahannon had had a microscopic examination made of the discharge by the State Board of Health of Florida, and tubercle bacilli were found in it.

At the time of admission to the hospital there was a large ulcer, of a dirty grayish color, at the inner canthus of the left eye. It was so painful that cocain had to be applied every few hours, in order to give relief, which, even then, was not complete. The ulcer was curetted and the site covered with a very thin Thiersch graft, which united promptly. The patient had absolutely no pain after the operation.

An ulcerative condition existed also on the right side of the nose, near the tip. This had been curetted a week prior to the meeting, leaving a raw surface as large as a thumb nail and quite deep, over which an exceedingly thin Thiersch graft was placed. The appearance of the graft gave every indication of a perfect result.

Dr. Radcliffe also showed a case of ectropion cured by Thiersch grafts, after failure by other operations.

Discussion.—Dr. Risley congratulated Dr. Radcliffe on his results in these Thiersch grafts, and said that he was particularly delighted with this method, by which it was possible to get in situ a sufficiently thin Thiersch graft over the denuded surface. This contracted less than anything else that he knew of, and the ultimate results from its use were better than those of any procedure that he had ever tried. He stated that when these grafts do not include the true dermis, they do not shrink afterwards. He had often insisted upon the technic of the operation, stating that one should avoid killing the cells by rough treatment. The grafts should not be removed from the surface of the razor until time to place them on the surface of the wound.

Dr. F. J. Walter, of Daytona, Florida, had been impressed with the healing which had taken place. There had been quite a little suppuration, and he had feared that Dr. Radcliffe would not be able to obtain so profitable a result as he had succeeded in getting. Dr. Walter thought that this success had been due to the use of a very thin graft, which had been placed in good apposition with the parts of the cavity at the time of the operation. The beautiful result that followed had been rather a surprise to him, particularly as the ulcer had been so painful.

Dr. Henry L. Picard asked whether Dr. Radcliffe had taken into consideration the idea that the condition might be an epithelioma in these cases.

Dr. Radcliffe replied in the negative, and stated that he had at first taken it to be lupus.

Dr. Picard said that he had seen cases of lupus in adolescents; but that the ulcerations on the face of a man of the age of the patient, usually appearing on a line from the angle of the mouth to the ear, he had always been led to believe to be cancerous or rodent ulcers.

A Case of Interstitial Keratitis Treated With Injections of Enesol.

Dr. S. Lewis Ziegler showed a patient whom, he understood, had been in the hospital previously, and had been treated with salvarsan, the Wassermann test having been found positive. Improvement, however, had not followed the injections. Dr. Ziegler had used enesol, on account of its successful use by Dr. Darier, who had injected a great many cases with it intravenously in his clinic. Dr. Ziegler had seen him inject ten or fifteen cases in a single afternoon; and, as the possibility of obtaining salvarsan was limited, he thought it would be a good thing to try this excellent substitute for it. He stated that in this patient the eyes had been extremely irritable, but were becoming quiet, and that the cornea was clearly very rapidly. The patient had come into the hospital on the 3d of July. Dr. Ziegler said that enesol is salicylarsenate of mercury. It comes in ampules containing 1/300 of a gram, and can be used either intramuscularly or intravenously.

J. MILTON GRISCOM,
Secretary.

PHILADELPHIA POLYCLINIC OPHTHALMIC SOCIETY.

Meeting of November 5, 1914.

Case With Characteristics of Trachoma and Vernal Conjunctivitis.

Dr. Wendell Reber exhibited a case which, when he first saw it, presented some of the characteristics of trachoma and vernal conjunctivitis. Both lids were filled with granules, but on closer inspection there were a great many flattened pavement-like granules, resembling what the dermatologists call plaques. There was some itching of the eyes and an unmistakable suggestion of milky-white iridescence in the conjunctiva. The condition had existed for nine years without the slightest involvement of either cornea, the patient being nineteen years of age. The granules were almost cartilaginous in texture, with a very fine false membrane which could be detached from among them at almost any time, so that it was easy to pull out the stringy or elastic secretion which by certain authorities is held to be characteristic. The patient had practically no scratchy sensation from the large pavement granules. Mitigated copper stick with copper citrate ointment at night as a therapeutic test aggravated the condition. A two grain to the ounce solution of copper sulphate has proved more efficacious than any other application in this case.

Dr. Reber presented the case particularly for purposes of differential diagnosis between vernal conjunctivitis, which he thought this case illustrated, and trachoma, which was the subject for discussion at the meeting.

Trachoma in Pennsylvania.

Dr. Clarence P. Franklin (by invitation) said that trachoma under the law of Pennsylvania is a reportable disease, but that difficulties of diagnosis caused much laxity in reporting trachoma as a contagious disease. There are many cases existing in the state unreported. The law makes no provision for care or segregation after the disease is reported.

He spoke of the scope of work of the Health Department in finding trachoma, and the subsequent care of the disease. He gave a sketch of the system in use in England at present,

which consists of school homes to continue the education of children who have trachoma, while under public care and treatment.

There has been a plan advocated by the Commission on the Conservation of Vision for an initial school home hospital, located near Pittsburgh, a center of great density of trachoma cases among the foreign born coal and iron mining population.

This plan is in temporary abeyance, awaiting the result of a conference among all those interested, both sociologically and medically, looking toward the introduction into the next legislature of a bill requiring all hospitals receiving state aid to open their doors to cases of trachoma, gonorrhea, syphilis and tuberculosis.

Differential Diagnosis of Trachoma.

Dr. William Zentmayer spoke upon the differential diagnosis of trachoma. In the first stage of the disease it might be mistaken for follicular conjunctivitis. In the second stage the affections with which it might be confounded are vernal conjunctivitis, Parinaud's conjunctivitis and tuberculosis of the conjunctiva. In the third stage there is a resemblance to pemphigus of the conjunctiva and to the shrinking of the conjunctiva following burns.

According to Axenfeld, the finding of Prowazek-Halberstaedter inclusion bodies in a case of follicular affection of the conjunctiva would strengthen the diagnosis of true trachoma, but their absence would not exclude trachoma.

Treatment of Trachoma.

Dr. Luther C. Peter feels that our state laws are inadequate to meet our needs in the prophylactic treatment of trachoma. The following-up treatment should be rigidly enforced after they leave the hospital, and ambulant cases should be instructed as to the dangers of infecting those about them, also as to the necessity for using their own washing utensils, linens, etc.

The first indication of trachoma, the infection, is best treated by simple, nonirritating collyria, such as boric acid wash and normal saline, rather than strong antiseptic solutions, such as bichlorid of mercury. Nitrate of silver should be applied to the lids daily by the surgeon, to relieve the in-

flammatory symptoms, supplemented at home by ten to twenty per cent argyrol solution. No operations are indicated in this stage other than canthotomy to relieve the blepharospasm and pressure.

The second or beginning cicatricial stage is best treated by copper crystals applied to the everted lids once in forty-eight hours. This may be supplemented by home use of citrate of copper ointment, increased from five to fifteen per cent. Surgical interference hastens recovery at this stage; the pricking of each follicle by a sharp bistoury, or Beers' knife, followed by a careful expression of the follicles with a suitable roller forceps under general anesthesia, accomplishes a maximum result with a minimum amount of damage to the tissues. After operation the copper treatment should be again resumed. Dr. Peter has found the use of glycerite of tannin, followed by the dusting of an iodine bearing powder, such as aristol, valuable in the final stages of the disease. They are also applicable in the acute stages when acute inflammation has disappeared and the patient shows signs of recovery.

The third or cicatricial stage is largely the treatment of the sequelæ of the disease, and is therefore largely surgical.

Treatment of pannus in a majority of instances, when it is of mild degree, is that of the general treatment of trachoma. It usually disappears with the disappearance of other symptoms. Severe forms may require more heroic treatment, such as peritomy, and when the corneal tissue become the site of ulceration, treatment suitable to the condition should be employed.

Four points should be emphasized in the treatment of trachoma:

1. The use of mild collyria, rather than strong mercurial washes;

2. The employment of such surgical operations, when indicated, as will bring about a maximum result with a minimum damage to the tissues.

3. Most careful refraction of trachomatous patients after recovery.

4. A following-up system should be practiced, so as to insure complete cure.

Discussion.—Dr. William Campbell Posey said he had seen two or three cases similar to that shown by Dr. Reber, and

even a little more marked and where the follicles were harder. There was no question of the uselessness of rolling in the cases referred to, the only thing to do was to pare them down with a very sharp follicle knife. Until they were pared down they irritated the cornea.

He said the differential diagnosis of trachoma is simple enough. In vernal conjunctivitis the cornea is usually clear, while the conjunctiva is characterized by a milky-white haze. Dr. May has thought that cases like this one of Dr. Reber's and the ones I referred to presented a mixed type, but I think they are cases of vernal conjunctivitis which have persisted for some years. The granules are so hard that the cold weather does not affect them.

Within the last week I had a young man sent to me with inflamed eyelids. On first looking at the lids I thought it was trachoma. The young man had adenoids and evidences of inflammation of the lymphatic system. The inflammation in the eye was phlyctenulosis. Although the inflammation had persisted for a number of years, the cornea was clear and the granules were in ridges. The man was under twenty years of age. Adenoids were taken out, the lids were rolled, and treatment was about the same as that outlined by Dr. Peter.

If possible, children with trachoma should be sent to a trachoma school, but you cannot do that with adults. It is a very difficult sociologic problem. Say a man has a large family—what are you going to do with him? For after three or four weeks of hospital care he must be turned loose. His family must be cared for. To my mind the thing to do would be to have the social worker go to his house and show him how to live, and also go to his place of business and explain to his fellow workers the danger this man may be to them. There must be better housing conditions for men afflicted in this way. The best plan would be to send these men and their families to a detention hospital and let the man go out and work while the families were cared for, but that of course is an expensive plan. The best thing is to open the wards of some hospital to this class of cases. The development of the social service system will see that these cases are taken care of.

W. WALTER WATSON,
Secretary.

OPHTHALMIC SECTION,
ST. LOUIS MEDICAL SOCIETY.

Meeting of October 7, 1914.

The Binocular Gullstrand Ophthalmoscope.

Dr. W. H. Luedde demonstrated the binocular Gullstrand ophthalmoscope, also a number of inserts and fundi by means of it.

Parenchymatous Keratitis in Acquired Lues.

Dr. Wm. F. Hardy read a paper on parenchymatous keratitis in acquired lues, in which he reviewed the literature and reported the following case:

C. R., male, aged seventeen years, came under observation January 9, 1909, with the right eye affected. There was much photophobia and lacrimation. The eye had been sore one week. He gave a definite history of a primary lesion a little less than one year before. The history was also fairly definite as to secondaries. O. D. V. = 18/240; O. S. V. = 18/19.

The tentative diagnosis at the first visit was iritis. Soon, however, the true character of the affection declared itself. The corneal cloudiness became so bad after the left eye became involved that the patient had to be led about. The opacity in each cornea was very dense; salmon patch formation was marked in each eye. He was put in a hospital and given roborant treatment in addition to inunctions daily of Hg. The process slowly subsided under general and local treatment, and considerable clearing of the corneae took place. He was under constant observation for six months. When discharged he had large corneal clouds which compromised vision very much; vision = 18/240. When seen a year later, vision = 18/120, and the patient was able to hold a position as driver for a drug house.

The left eye became involved about two months after the right one.

Here we had a case showing a typical picture of parenchymatous keratitis such as occurs with hereditary lues. Both eyes were involved, the affection was very severe and pro-

longed, and vision was much reduced. He had none of the stigmata usually associated with hereditary syphilis—no Hutchinson's teeth, no saddle nose, no rhagades, and no deafness. In view of the opinion held by Fage, it might be contended that this was a reappearance of a former parenchymatous keratitis due to hereditary lues. No history of a previous eye trouble was obtained, and, furthermore, an initial lesion and secondary manifestations seemed satisfactorily vouched for. It is possible for an individual to have hereditary lues, undergo cure and later acquire a fresh infection. Igersheimer, in discussing the treatment of this disease, refers to that possibility. He advises that all cases should be energetically treated with salvarsan and Hg. to avoid complications such as pathologic changes in the nervous system. He stated that an antisiphilitic course has no influence upon the keratitis itself.

The effect of such treatment may be so successful that the patient may contract syphilis a second time. The age of the patient reported here, seventeen years, is well within the age limit of those cases generally accredited to hereditary lues. He was of a development equal to that of a boy of twenty years, was sexually active, and had on numerous occasions laid himself liable to venereal disease. His age, therefore, was not against acquired syphilis.

The points to which he called special attention were: (1) The age of the patient—young enough to have a keratitis due to hereditary lues, though it may occur at any age, but is unusual late in life, and old enough to acquire lues and suffer its corneal manifestation; (2) the fact that it was bilateral; (3) that it appeared within one year of the initial lesion; (4) that the keratitis was most severe and that iritic symptoms, photophobia and lacrimation were pronounced; (5) the dense opacification of the cornea with typical "salmon patches," the clearing progressing to a considerable degree, permanent opacities, however, remaining—the process in its entirety appearing like a severe one as it occurs in the hereditary type of cases; (6) if we admit in such instances the possibility of the keratitis being due to a previous hereditary taint, then it will be necessary to revise all our theories concerning parenchymatous keratitis and the curability and transmissibility of syphilis.

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IX.

THE QUESTION OF SPONTANEOUS SYMPATHIZING INFLAMMATION.

PROFESSOR J. MELLER,

VIENNA.

TRANSLATED BY GEORGE M. WALDECK, M. D.,

DETROIT.

In an article recently published by Fuchs,¹ concerning chronic endogenous uveitis, he was able to show five different types of this disease from the anatomic findings.

The first three groups may be considered together, as they are anatomically related and may overlap each other.

1. Cases with changes in the iris, often also in the choroid, but without involvement of the ciliary body.

8. Cases with changes in both the iris and the ciliary body, in which the absence of cyclitic membranes is important as a negative sign and the proliferation of the epithelium as a positive sign.

3. Cases with membranes within the eye, on the ciliary body and frequently also on the choroid.

The fourth group, however, to which belong the cases similar to sympathetic ophthalmia, and the fifth group, to which belong the cases with especially thick infiltration of the uvea and retina, as also marked necrosis of both, stand out as distinct units.

The number of cases belonging to group 4, which have been reported up to now, is still very small. Two were published by Botteri from Fuchs' clinic in 1908, one case by Kitamura.² and one case by Weigelin.³ In one of Botteri's cases, and in Kitamura's and Weigelin's, both eyes became diseased.

I now wish to report two new cases of this character. In one case the disease was limited to one eye, which was enucleated, while in the other both eyes were involved.

Botteri's cases, as well as the cases I wish to describe, were iridectomized because of severe iridocyclitis, and offer, in so far as the meaning of the anatomic picture, certain points of attack. The cases of Kitamura and Weigelin, which are exactly like those of Botteri and my own, were not operated.

These cases cannot be disregarded merely because of the operative perforation of the eye. The iridocyclitis for which the operation was performed had developed spontaneously, and histologic examination showed no signs of another kind of iridocyclitis than that which was already present at the time of operation. This is mentioned in the beginning in order to avoid misunderstanding.

These cases have aroused a great deal of interest since their recognition. If it were possible to establish the identity of this spontaneous iridocyclitis with sympathizing inflammation—proof of which is not possible upon clinical and histopathologic observation alone—a number of important conclusions could be drawn with regard to the origin of real sympathetic ophthalmia.

I was the first, some years ago, to dispute the theory that infection of the first eye must be exogenous, and that unconditionally a perforating injury must precede the development of sympathetic ophthalmia.

From a series of facts I have come to the conclusion that sympathetic affection, or, more exactly, a sympathizing inflammation, may depend upon endogenous causes. Since then a number of papers have appeared which have sought to bring forth new evidence for this view on other bases. Elschmig especially professed to establish the endogenous origin of sympathetic ophthalmia on the ground of serologic discoveries.

It is not my intention at this time to go into the side issues, and I will concern myself only with the description of these

cases of spontaneous iridocyclitis with the picture of sympathizing inflammation. I shall first describe both my own cases:

Case 1.—M. G., fifty-four years of age, woman. Anamnesis, July 23, 1900. Patient as a child had repeated eye inflammation and has probably never seen well with the right eye. Since five months ago the right eye has been diseased. Severe pain developed in the eye and in the head, and vision gradually diminished. The patient has always seen well with the left, and believes that it is completely sound. She knows no cause for her disease, no articular rheumatism, no signs of lues. One child died of convulsions several days after birth. Her periods continued until the age of forty, were always regular and she has had no hemorrhage since. On the twentieth of April, 1900, she was admitted to the dispensary clinic and atropin and salicylates prescribed.

Status Presens, July 23, 1900.—A strongly built woman, internal findings negative. marked ciliary injection, cornea dull. A macula somewhat outward from the center and a second one at the limbus, outward and down, anterior chamber somewhat deeper than the left. Iris structure indistinct, the smaller iris ring markedly swollen. Pupil contracted obliquely oval, the lower pupillary margin appears shortened through a broad posterior synechia. Also the upper pupillary margin is adherent to the lens capsule. The cornea shows an exudate deposit on the posterior layers. Down and out in the periphery is a circumscribed forward bulging of the iris. Tension distinctly raised.

O. S.: Eyeball pale. Cornea clear and bright. Anterior chamber deep, iris structure distinct. Pupil normal, reacts sluggishly. Practically the whole of the pupillary area of the anterior lens capsule is covered with pupillary membrane. Fundus normal.

Vision: O. D., hand movements; light perception five meters. Projection perfect. O. S., fingers at six meters; with 3 D. = 6/24; Jaeger 3 at fifteen centimeters.

July 24, 1900. O. D.: Iridectomy up and in; marked hemorrhage.

July 25, 1900. Anterior chamber reformed, blood absorbed.

August 1, 1900. O. D.: Marked ciliary injection. Cornea dull; up and in at the limbus an operative cicatrix still suf-

fused with blood. Anterior chamber deep. Three millimeter high hyphema. Iris structure indistinct; up and in a small coloboma, which in its lower half is covered by the exudate membrane closing in the pupil. Tension normal. Vision, hand movements before the eye. The eye did not become quiet again after the operation. The inflammation persisted unchanged, and as the pain increased in intensity, the patient consented to enucleation. She was admitted to the clinic August 24, 1900, for this purpose, and at that time the following findings noted:

O. D.: Lids swollen, marked ciliary injection. Cornea dull and cloudy throughout. Maculae as earlier described. Above at the limbus is a linear operation scar, six millimeters long and markedly vascularized. The whole cornea is traversed by numerous superficial and deep vessels. Anterior chamber shallow, iris atrophic and grayish discolored. Pupil is indicated by a distorted fissure. This extends above into the coloboma, the borders of which are very irregular.

O. S.: Eye quiet and good pupillary reaction. The enucleated eye was hardened in Müller's fluid. The left eye remained sound as observed six years later. The patient herself enjoyed good health.

Histologic Findings.—The eye was cut in vertical sections (Fig. 1). Close behind the limbus the operation scar (O) traverses the sclera obliquely. In the middle of the incision the superficial layers have healed by scar tissue, while in the deeper portion the round edges are held apart by the incarcerated iris. In the marginal portion vision has been prevented by the interposition of the iris. The cornea is traversed by vessels, most of which are in the middle and posterior layers. The cornea is somewhat richer in cells in the region of the operative scar, especially in the immediate vicinity of Descemet's membrane. In the aqueous are many mononuclear cells and occasional polynuclear leucocytes. The root of the iris is caught in the wound above and bows forward. The coloboma is filled with a pigmented membrane which has grown in with the incarcerated iris and the posterior margin of the cornea. The lower pupillary border passes over into this membrane without distinct margins and is pulled above by its shrinking. The membrane may be traced on the anterior and posterior layers of the iris. The incarcerated iris root is

richly infiltrated with lymphocytes. The pigment epithelium is in a state of marked disintegration and shows large round cells. The posterior layer of the iris is covered throughout by a membrane which unites it with lens capsule. The entire parenchyma of the iris (J) is infiltrated throughout, but more abundantly in the posterior layers, where the infiltration is so thick in places that the parenchyma itself is no longer distinguishable. The cells of the infiltrate are mainly small lymphocytes, between which are scattered many plasma cells. The pigment epithelium is entirely obliterated in places. Portions are still discernible in irregular masses, repeatedly

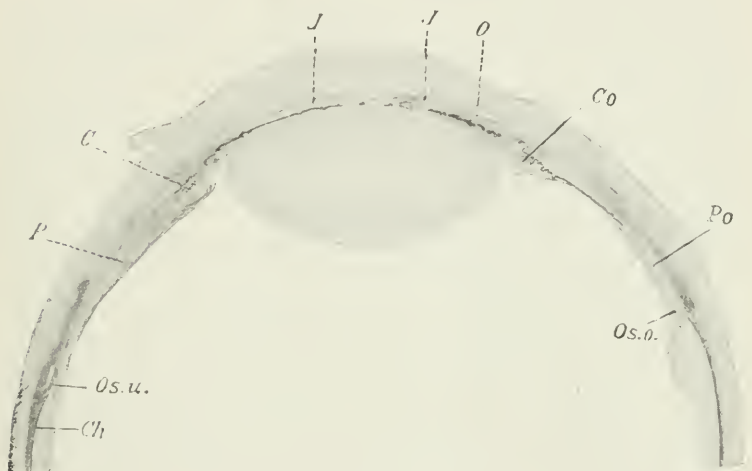


Figure 1.

broken through by the iris infiltrate, especially in the periphery. This portion lies near the ciliary body, where the masses of infiltrate occupy the space between the posterior surface of the iris and the lens. In the more central portion, as already mentioned, a membrane more or less rich in cells is present between the posterior layers of the iris and the lens capsule. Occasionally one finds among the cells of the iris infiltrate large oval weakly stained cell nuclei, probably epithelioid cells. The vessels of the iris have thickened walls.

The ciliary body (C), especially on the under side, shows more extensive changes. The ciliary processes are scarcely

longer recognizable, only occasional remnants of pigment epithelium are seen. The ciliary muscle fibers are proportionately the best preserved. Of the ciliary processes only a few remain, which stain as red stripes. Otherwise, the place of the ciliary body is occupied by an infiltrate which, after breaking through the epithelium, has spread out on its inner side. The pars plana especially is diseased. It is very thick and represents a large infiltration mass, in which the pigment epithelium is completely obliterated. Lymphocytes preponderate in the infiltrate of the ciliary processes, but the infiltrate of the pars plana is composed principally of epithelioid cells, between which lie small lymphocytes and plasma cells in varying numbers, and a few eosinophile cells.

The ciliary body above (Co.) is but slightly changed in the neighborhood of the iridectomy wound in the anterior part. Small lymphocyte foci are found occasionally near the insertion of the ciliary muscles. The ciliary processes are imbedded in an infiltrate in which the unpigmented cells of the epithelium show an active proliferation and the formation of cell nodules very similar to epithelioid cells. The pars plana (Po.) is also markedly diseased and much thickened here. The infiltration is relatively least in the lamellæ near the sclera (Plate IV, Fig. 1). The middle layers are infiltrated with numerous lymphocytes. The innermost layers near the vitreous show principally epithelioid cells, with many giant cells. The pigment layer (Pi.) is frequently broken through (K, K_1), whereby the infiltration spreads out underneath the unpigmented layer (U) and raises it up in lumps. Although this cell layer offered a stronger resistance, the infiltration finally made its way through it and traveled further on the inner surface. The changes extended to the ora serrata, where the infiltration (K_1) pushes itself forward under the insertion of the retina (Os.). At the ora serrata below (Os. u., Text Fig. 1) the infiltrate described extends further into the choroid, markedly diminished in size, while the retina is normal, with the exception of a slight small celled infiltration at its insertion. The choroidal infiltration consists principally of small lymphocytes, distributed partly more diffusely in all the layers of the choroid (Ch), partly as more or less sharply circumscribed nodules in the layer of medium sized vessels. Lighter areas in the middle of the choroidal infiltration, seen

by weak magnification, indicate groups of epithelioid cells. From about the region of the equator on, the choroid is then quite normal. Only in the neighborhood of the optic nerve does the choroid show a nodular thickening. The nodule is 0.64 mm. long, and 0.268 mm. high, bulging the inner and outer layers of the choroid. It consists in its periphery of closely packed lymphocytes, while the more lightly stained center is composed of epithelioid cells. The lamina elastica of the choroid is pushed forward by the infiltrate, and at some points cells have wandered through. In the immediate neighborhood is a second smaller nodule which consists almost entirely of epithelioid cells and is surrounded only by a narrow border of lymphocytes. The above described infiltration in the upper half of the choroid stops at the ora serrata (Os. o., Text Fig. 1), and there remains only a somewhat rich infiltration of small round cells in the choroidal stroma. The choroid is swollen in all its layers near the equator, by the development of an infiltrate of lymphocytes and epithelioid cells. Above, the lamina elastica is eroded and begins to disappear. A more regular infiltration somewhat less in degree follows in the outer layers of the choroid to the region of the equator, from where on the choroid is quite normal. An isolated circumscribed nodule of lymphocytes lies close to the optic nerve. The retina shows a mild degree of inflammation. It consists on the whole of a perivascular infiltration which spreads out around the blood vessels in the form of a thick covering of lymphocytes, in most places restricted to the retinal layers in which the blood vessels are situated. Here also, not infrequently, are found small nodules which include the entire thickness of the retina and extend to the membrana limitans externa, so that at these places exudate cells are found between the retina and the choroid.

The infiltration here described consists wholly of lymphocytes. Circumscribed formations are found at other places in the periphery between the choroid and the retina. (Plate IV, Fig. 2). At these places the choroid (Ch) is markedly infiltrated with small cells (J). The lamina vitrea of the choroid is broken through in the middle of the focus. The pigment epithelium (Pi) is missing at the border of the focus. In the middle it appears as irregular areas, where the cells originating from it are rather markedly proliferated; the

majority, however, remain unpigmented (E). The retina is adherent to the altered choroid, so that its structure has been entirely lost and consists of an irregular glial net.

It is questionable whether these adhesions were already present before the development of the now visible choroidal infiltration. In favor of this are similar alterations elsewhere without any accompanying infiltration of the choroid—typical old retinochoroidal foci. They are few in number and only in the periphery. Besides these, however, there are a very few nodules in the retina, which because of their epithelioid cell content are differentiated from the previously described lymphocyte infiltration and appear more like the uveal changes (Plate IV, Fig. 3). There the retina itself appears thickened by a nodular infiltrate, while a retinal precipitate is situated on its inner surface (P). The nodule is not sharply circumscribed and differs from the other intraocular infiltrates in that it contains no blood vessels, and consequently shows no perivascular infiltration, and that besides the small round cells, of which the majority are formed, a few groups of epithelioid cells (E) are present. Such nodules are found not only in the periphery, but also further back. The fact that they are occasionally present in the outer layers of the retina, also shows their independence of the blood vessels.

On the whole there is present on the inner surface of the retina a light exudation which consists partly of fibrin and partly of single or small clumps of cells, from which cells migrate into the vitreous.

The outer retinal layers are somewhat edematous, otherwise normal. The disc is somewhat swollen in consequence of a mild edema.

The sclera deserves special mention. In the region of the choroidal infiltration the sclera is also somewhat richly infiltrated with lymphocytes throughout its various layers, here also inclined to gather in the form of nodules. The episcleral tissue is also somewhat infiltrated. In addition to this more diffuse infiltration of the sclera, many sections, especially from somewhat in front of the equator, show a row of circumscribed nodules of lymphocytes nearly 1 mm. large adjacent to the surface (L), whose center consists of numerous epithelioid cells (E). Even giant cells are found in some of the nodules (Plate IV, Fig. 4). The choroidal infiltration

may be observed accompanying the veins and nerves through the sclera.

Case 2.—D. K., male, aged forty-seven years. Anamnesis. With the exception of an inflammation which was treated with silver, the patient had had sound eyes up to three weeks ago. At this time, following prolonged use of his eyes, he experienced one morning in his left eye the feeling as of a foreign body, which was soon followed by inflammatory symptoms. An attending physician treated it at first with silver nitrate, but as this proved too painful, later with atropin. Four days later the vision had diminished to light perception. Patient had had an ulcer of penis in 1884, which was treated with iodoform without further consequences. In 1886 he had rheumatism with nephritis, as he claimed; otherwise no diseases.

Status Presens, October 12, 1909.—Internal examination, urine and blood findings negative. O. D.: Normal. Vision, 6/6; fundus normal. O. S.: Quite marked ciliary injection. Cornea very dull with fine diffuse cloudiness; on the posterior surface are many gray precipitates of no definite arrangement. Anterior chamber shallow, the iris markedly blurred. The pupil dilated and round, no synechiæ. Tension somewhat raised. No red reflex from fundus. Uncertain light perception; no projection.

Therapy.—Eserin, dionin, internally aspirin, and in addition energetic sweating. Within the next few days, new precipitates appeared, the tension remained high, and on October 28th, 1909, an iridectomy was performed above in the left eye, which healed without mishap. Patient left the hospital November 7th, 1909, at which time the following findings were noted:

O. S.: Bulb quite strongly injected, cornea somewhat dull, and in the neighborhood of the scar deep opacities in the form of horizontal striæ. Abundant old brown precipitates. Chamber practically abolished, irregular coloboma above, occasional pigment spots on the anterior lens capsule. Tension somewhat raised. Counts fingers at 30 cm. Scarcely any fundus reflex obtainable. After leaving the clinic the left eye improved greatly, and the patient says he was able to see the window light.

In January, 1910, he claimed to have struck his left eye on

the corner of a table, whereupon the inflammation developed anew, and the vision very quickly disappeared.

In spite of treatment the inflammation remained unchanged until January 20, 1910, when the right eye suddenly developed photophobia and redness.

He presented himself at the clinic again on January 28, 1910, when the following findings were noted:

O. D.: Quite marked ciliary injection, anterior chamber shallow; iris, however, normal, and pupil reacts well. Fundus normal, vision, 6/6.

O. S.: Delicate gray precipitates on posterior surface of cornea. Chamber somewhat deeper than right. New-formed vessels on the swollen iris. Down and out in the recess of the chamber are lumpy elevations on the iris. Pupil is covered by a membrane. Pigment spots on the capsule which are only indistinctly seen through the pupillary membrane. No red reflex obtainable. Light perception at 40 cm. only in the center of the field. No projection.

The patient refused enucleation of the left eye, as advised. He again presented himself at the clinic on the 7th of February, 1910, following a rapid progress of the condition.

Status Presens, February 7, 1910.—O. D.: Marked photophobia and epiphora. Marked ciliary injection. Cornea dull, many small brown precipitates on its posterior surface; chamber very shallow; iris structure obscured, brownish green in color. Pupil of normal size, round and inactive. Tension normal. Counts fingers at one-fourth meter. Fundus not visible because of vitreous opacities.

O. S.: Moderate ciliary injection. Cornea dull; anterior chamber very shallow; iris greenish, with many new-formed vessels. The nasal pupillary margin shows large red spots. The pupillary margin is adherent to the lens capsule; above, a somewhat broad coloboma. Pupil and coloboma are filled with a gray membrane. Doubtful light perception.

In addition to the continuation of the local therapy already mentioned, intramuscular injections of mercury were given without any result.

February 14th, paracentesis of the anterior chamber was made in the right eye because of the increased tension.

March 28, 1910, the patient consented to enucleation of the left eye because of the pain.

As he left the hospital, April 2, 1910, the pupil was completely occluded by a gray membrane. The tension was slightly raised. He was able to recognize fingers with difficulty.

At the end of June the same year the patient returned to the clinic. The eye was stone-hard, the anterior chamber obliterated, the eye completely blind. The injection was very slight and the pain mild.

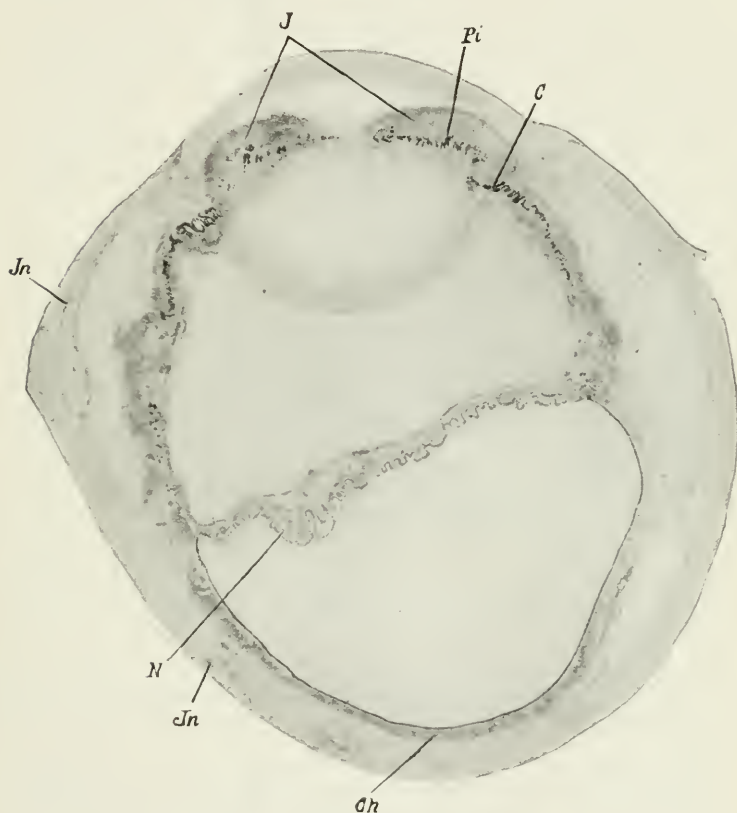


Figure 2.

The upper half of the enucleated eye was sectioned vertically and the lower half horizontally.

Histologic Findings.—The cornea is normal except that in the periphery a few of the deep vessels are surrounded by a small layer of round cells. The anterior chamber is filled with coagulated liquid with many exudate cells, mostly mono-

nuclear, many adherent to the posterior surface of the cornea. The iris (I) is thickened tumor-like (Text Fig. 2), especially in its periphery, reaching to the posterior corneal surface. It is somewhat thinner towards the pupil. The anterior chamber is of normal depth in the pupillary area, quickly becoming shallow, and in the periphery entirely obliterated. The granulation tissue substituting the iris has broken through the pigment layer (Pi), which is almost completely destroyed. It fills the entire space of the posterior chamber. The remains of the pigment layer of the iris are therefore only seen as black stripes and spots in the midst of tumor-like tissue. It occupies the whole extent of the anterior lens capsule, and has caused the formation of an anterior capsular cataract. The pupil itself is filled up by a rather thin connective tissue membrane containing numerous round cells. The structure of the infiltrate is readily seen, even by weak magnification in the hemalum-eosin preparations, because of the difference in color. The large pale red parts consist of very numerous epithelioid cells, between which course smaller and broader lines of deep dark blue nuclei of the lymphocytes. The latter form the chief contents, especially of the superficial layers of the tumor, as also of the border towards the ciliary muscle. Typical nodule formation is not found. Indeed, one finds by a stronger magnification epithelioid cells scattered everywhere. The real structure of the iris can no longer be recognized. Even the usually resistant sphincter is scarcely longer recognizable. The iridectomy wound is filled up by similar infiltrate. Even under the conjunctiva a nodule of epithelioid cells is found.

The swelling of the iris is richly vascularized, especially in the outer layers. The vessels appear as striking light rings such as Fuchs has described in sympathizing ophthalmia. Many epithelioid cells contain pigment granules.

In some parts of the infiltrate, especially in the posterior, near the lens capsule, the transition of cells into fibroblasts is noticed—the first signs of connective tissue formation.

Further back the tumor-like tissue invades the ciliary body, the processes of which, as well as the pars plana, show the same changes as the iris. Only the delicate black line of pigment epithelium lying in the middle of the infiltrate shows the original position of the processes. The ciliary muscle is less

involved, even though it is diffusely infiltrated by round cells, and the muscle nuclei themselves are in active proliferation. In the outer layers of the infiltrate near the ciliary muscle the lymphocytes preponderate, while in the inner layers are numerous epithelioid cells between the lymphocytes. Inasmuch as the infiltrate has very quickly broken through the pigmented layer of the epithelium at many places, it came to lie partly in the space between the two layers. However, the inner layer also suffered the most marked changes. It likewise took part in the proliferation and formed many rows of cells, the protoplasm of which is fused together, while the large pale oval nuclei in various sizes remind one of epithelioid cells. Practically all are lying with their long axes perpendicular to the surface, showing the original position of this layer. Inasmuch as here also the infiltrate has broken through, that is to say, the proliferated cells of this layer have passed over into the infiltrate, it has finally reached the inner surface and thus led to the uniform thickening of the whole ciliary body.

The flat portion of the ciliary body is somewhat pulled away from the sclera, whereby the lamellæ of the suprachoroidea are distended. The space between is filled by a coagulated fluid, and the lamellæ are infiltrated by many mononuclear round cells. Among them are many plasma cells, at places preponderating. In the infiltrate of the ciliary body, especially in the flat portion, are many giant cells, whose nuclei are arranged either irregularly in the cell body or in the periphery of the cells.

Many polynuclear and other cells have migrated from the ciliary body into the vitreous body, which has been reduced to a very small size by the total detachment of the retina. In a few places on the surface of the ciliary infiltrate a somewhat thin connective tissue membrane has been formed through organization.

The choroid (Ch) is diseased throughout its whole extent, relatively least directly behind the ora serrata. The infiltration has led to a fairly regular thickening of the choroid by the confluence of separate nodules. Everywhere are groups of epithelioid cells, mostly in the layer of large and medium sized vessels, surrounded by more or less numerous lymphocytes. Scattered through are many cells. The choriocapillaris has been spared, as has also the elastic membrane. The inner

layer of the choroid was not broken through. Many sections show sharply circumscribed nodules of epithelioid cells with giant cells, surrounded by lymphocytes in the midst of but slightly changed choroid.

The sclera is very actively involved in the process, especially the anterior portion. Here the rather thick, small round cell infiltration is present in the most inner scleral lamellæ in direct continuation with the ciliary inflammation. This infiltrate (In), consisting mostly of lymphocytes, but also containing epithelioid cells, follows along the nerves and vessels to the outer layers of the sclera.

The retina (N) is totally detached, the subretinal space filled by fluid without cells. The retina is markedly inflamed, strongly edematous and contains hemorrhages. The infiltration is especially marked about the vessels. The surface of the retina is covered by an exudate which consists of mononuclear cells, at places changing to connective tissue.

The optic nerve is rather strongly infiltrated with small cells, even far back of its entrance into the sclera. The central vessels are surrounded by a thick layer of lymphocytes at a distance of 5 mm. behind the papilla. Many lymphocyte foci are present in the septa between the nerve fiber bundles. Besides this a nodule $\frac{1}{2}$ mm. in size, whose center contains epithelioid cells (E), is found 3 mm. behind the papilla in the nerve trunk (O) near the pial sheath (P). (Plate IV, Fig. 5.)

The presence of necrosis is remarkable among the findings, which until now have corresponded to a sympathizing ophthalmia. A necrotic focus (Plate IV, Fig. 6) (N) lies on both sides of the ciliary infiltrate at the end of the flat portion of the ciliary body (P), where the retina bends off. It is about 4 mm. in its longest diameter and 2 mm. in its broadest diameter.

In most sections, however, it appears only 2 mm. long and somewhat over 1 mm. broad. The center of the necrotic mass has fallen out. The periphery is formed by a strong wall of lymphocytes, while the inner portion contains epithelioid cells (E) and also a few giant cells (R), which are arranged around the necrotic portion. The infiltrate was especially great here, taking in the whole angle formed by the oblique course of the detached retina from the ora serrata towards the inner part of the eye. Careful examination of all

sections failed to show a necrosis elsewhere. Staining for bacteria was negative.

It is not necessary to describe in detail the similarity of these cases to sympathizing ophthalmia; it has already been shown by the preceding, and has been brought out in detail in the description of the earlier cases. Let us rather search for differences in order to ascertain whether we may call this disease not only similar, but identical, at least histologically, with sympathizing ophthalmia.

A marked involvement of the sclera by the inflammatory process is common in these cases. In the first case of Botteri, in addition to a nodule on the outer layers of the sclera, containing epithelioid cells, lamellæ were separated by an infiltration, and the entire sclera appeared more rich in nuclei than normally. In the second case of Botteri the sclera was markedly infiltrated with round cells on one side corresponding to the ciliary body. Similarly, Kitamura's case showed the sclera to be invaded to a limited extent at one place at the limbus by granulation tissue. On the other hand, in Weigelin's case the sclera did not appear to be involved. In case 1 of my own the sclera is essentially involved in the process. Many typical nodules with epithelioid cells are found in the superficial layers, especially in the region of the equator, also somewhat anterior and posterior from the equator. Most of the nodules are imbedded in the loose tissue of the episclera, but a few lie with their bases between the most superficial lamellæ of the sclera itself. Vessels are found only in the lymphocyte border of the nodules. The walls of some of the vessels are normal, while others show fresh lymphocytic infiltration and swelling of the endothelial cells. The nodules are fairly well circumscribed, though stripes of lymphocytes invade the superficial fibers of the sclera. The episcleral tissue shows a slight involvement in the inflammatory process in the anterior part of the eye and is more rich in cells than normally.

The sclera takes further part in the process by a diffuse small cell infiltration between its fibers, especially somewhat anterior to the equator, about the region corresponding to the seat of disease in the choroid. Near the ciliary body the sclera is somewhat less involved. The sclera is richer in nuclei than normally, and its fixed cells have surely increased in number; besides, the lamellæ are in many places pushed

apart by the small round cells. This comes partly direct from the choroidal infiltration into the inner layers of the sclera, although the infiltration into the middle layers of the sclera is entirely independent of the choroidal condition. The third way in which the sclera participates is by the growing out of infiltrate along the vessels and nerves which traverse it. This is seen along the anterior ciliary vessels as well as along the vortex veins, but is not extensive anywhere. It remains restricted to a few rows of lymphocytes. In Weigel's case the infiltration along the vessels was only visible in a few places.

In my case 1 the scleral condition appears not so much secondary to the choroidal affection as parallel to the accompanying uveal disease, as though the process had been incited by the same cause.

Also the first case of Botteri brought out the fact that the infiltration of the choroid had the tendency to wander out along the emissaries, but that otherwise no direct relation could be established between the nodules situated on the surface in the region of the equator and the infiltration of the eye.

In my second case the infiltration of the sclera is conspicuous.

It would be a mistake to interpret this as a difference from sympathizing inflammation. For in the latter, as Fuchs has explained, the infiltration of the choroid as a rule penetrates somewhat between the innermost layers of the sclera, which coincides with the supposition that the suprachoroidal lamellæ gradually pass over into the innermost layers of the sclera. Cases have also been known in which the sclera has been broken through by the inflammatory new growth itself.

The disease of the iris and ciliary body in all the cases described are histologically the same as the alterations in typical sympathizing ophthalmia.

In case 1 the severe involvement of the flat portion of the ciliary body is noteworthy because Fuchs has observed this change often in chronic endogenous uveitis (in his first three groups). Case 2, with the exception of the necrosis, could with hesitation be classified as high grade sympathizing ophthalmia.

Less typical in some cases is the state of the choroid. In

case 1 the disease diminishes visibly from the ciliary body towards the choroid; only a few isolated nodules containing epithelioid cells are found further back in the region of the optic nerve. In most cases the posterior part of the choroid was involved to a high degree, the nodular form of the infiltrate preponderating over the more diffuse in the anterior layers. But we know also from Fuchs that the choroid may take part in a varying degree in sympathizing infiltration. If, however, the choroid is prominently diseased in most cases, there are also cases in which the infiltration of the choroid is most insignificant.

In case 1, as also in the cases of the other authors, there is no tendency to disintegration or necrosis which is in accordance with the findings in sympathizing ophthalmia. The infiltrate also gives the impression of a fresh active proliferation. The necrosis in case 2 appears to be an important difference from typical sympathizing ophthalmia. Fuchs says, in his first work on sympathizing inflammation, in 1905: "Necrosis has not been found by any observer up to now. But, a priori, the possibility must be considered that tissue substance of any origin may become necrotic if the blood supply does not keep pace with the growth." Dr. E. V. L. Brown,⁴ in a publication of a special kind of proliferating choroiditis, was unable to find any observation of such necrosis in the literature since that time.

Case 2, because of the necrosis, approaches group 5 of Professor Fuchs' classification, endogenous chronic uveitis, of which only two cases are known. The necrosis in my case, however, is not an important property of the disease process. It appeared only at one place, at the ora serrata, where the infiltrate was especially great and was probably brought about by local causes (destruction of the vessels in the infiltrate). It was found at no other place in the eye.

For this reason, and also because the retina has no similar specific infiltration, the case cannot be placed in group 5. We can much more easily classify it under sympathizing ophthalmia, in spite of the one contrary finding.

Special mention must be made of the presence of old peripheral retinochoroiditis in case 1. This resulted from an earlier uveal disease, where the iris was still normal and therefore external inflammatory symptoms were missing. The

frequency of foci of fresh and old choroiditis in chronic endogenous uveitis was brought out by Fuchs in the work previously mentioned.

My first case is distinguished by the independent appearance of specific nodules in the retina, and apparently differentiated from cases classified under group 4 by Fuchs. The threefold character of the retinal disease in this case has already been brought out. The one concerns old retinochoroiditic foci, in which the retina has become involved only secondarily through an inflammatory process arising in the choroid. The second is represented by the small-celled perivascular infiltration "which is always present in a severe irritation of the inner eye" (Fuchs). The same condition is found in all other cases of this kind. The third is noteworthy because specific nodules, however few, have developed in the retina independent of the choroidal infiltration. The fact that the nodules contained in the retina are still small, may mean that it is not until later that the retina becomes favorable for the development of the process, perhaps sensitized by the inflammatory changes mentioned above as the second type. At all events, the retina does not offer a favorable ground for the development of this condition. In Weigelin's case, nodules with epithelioid cells were found in two places in the optic nerve. In Botteri's cases specific involvement of the retina and the optic nerve are wanting, as also in Kitamura's case. My second case is noteworthy because of such a nodule in the optic nerve.

This primary participation of the retina in the specific process does not differentiate my case from sympathizing ophthalmia. It is certain that in the latter the affection of the retina arises for the most part secondarily by the invasion of the infiltration from the choroid. But typical proliferation in the retina has also been seen frequently (Ruge). In this relation the case approaches group 5 of Fuchs' classification, in which the retina is involved.

Concerning the affection of the optic nerve, the findings correspond with those in sympathizing ophthalmia as set forth by Fuchs. The inflammatory changes in the optic nerve and its sheaths show nothing characteristic. They show merely the usual appearance in any severe inflammation of the eye. The cases of Schirmer and Ruge show that exceptionally also typical foci may be present in the optic nerve.

From the foregoing it may be seen that in relation to the histologic findings an essential difference between this affection and sympathizing ophthalmia does not exist. Neither is there a definite clinical difference. The objection that in my case 1, as well as in the first case of Botteri, no inflammation of the second eye followed, cannot be offered. Cases are known in which the characteristic uveal disease after trauma was present without the other eye becoming involved. I shall have more to say later concerning cases of this sort. In the other four cases, 66.6 per cent, the other eye was indeed affected with an iridocyclitis. It may be that the outbreak of the disease in the other eye was prevented in the first case by enucleation.

I have already mentioned that the iridectomy performed in four of the cases could not be used to designate them as the ordinary sympathizing inflammation after a trauma, because the iridectomy was made for a very severe iridocyclitis, which had almost entirely destroyed the vision in a strikingly short time. Besides in case 1, enucleation followed very soon after the iridectomy, so that we have every reason to believe, as also evidenced by the histologic findings, that the same kind of uveal infiltration was already present at the time of the iridectomy. It is conceivable that in the majority of these cases only iridectomized eyes may be obtained for histologic examination, because the severe course of this form of iridocyclitis compels operative interference before the eye becomes so bad that enucleation is necessitated. On the one hand is the objection just made, which, however, cannot be advanced for the quite analogous cases of Weigelin and Kitamura, and on the other hand is the objection that if we attach importance to the absence of trauma, the classifying of these cases under sympathizing ophthalmia would have to be abandoned. On this point I shall have more to say later.

In Weigelin's case, in which the first eye was destroyed by a spontaneous iridocyclitis and enucleated without a previous operation, the disease of the first eye had begun sixteen years before. The eye became blind in the course of years through repeated recurrences, but at the time the other eye became diseased (one year preceding enucleation) showed no inflammatory signs. The iris was much thickened and traversed by blood vessels. It is remarkable indeed that quite fresh infil-

trations were found upon histologic examination in this eye, blind for so many years.

It is not unusual to find fresh small round celled foci in eyes which have become blind years before through iridocyclitis. But in this eye the whole uvea was diseased to a high degree, and, as has been described, replaced by an infiltrate which could not possibly have been present for so long a time. One finds in anatomic examination of eyes which have developed a sympathizing ophthalmia many years after an injury, quite fresh inflammatory uveal changes. Through this the etiologic connection, if not indeed the actual dependence of the disease of the second eye upon that of the first, may be established. At first the thought arises that the second eye has become diseased independent of the first, perhaps through the same cause which had brought about the condition in the first eye fifteen years before, as in cases of hereditary lues which develop a parenchymatous keratitis in one eye and sometimes in the other eye only after many years. The duration of sixteen years in the Weigelin case is surely remarkably great, but its possibility must be conceded. How may we explain the quite fresh inflammation in the first eye by this conception? Some time ago I advanced this fact as ground for accepting an endogenous origin of sympathizing ophthalmia. Perhaps here also the specific inflammation has recently developed in an eye in which the way has been prepared by a preceding inflammation of a different nature.

If Elschnig has concluded from his researches that there is no essential difference between sympathetic iritis and the so-called idiopathic, I should like to have this understood in the following manner. One form, quite seldom, however, among the many and perhaps different forms of uveal disease which we have up to now classified under the meaningless term of idiopathic iridocyclitis, is that one which we have long since known as sympathetic ophthalmia. It develops most readily in people whose uvea, injured through other causes, have become sensitized to the noxa of this disease. But not every somatic anomaly can incite this disease of the uvea. The pathologic changes are so specific that it may be spoken of only as a quite definite noxa. Also the so-called anaphylactic uveitis has nothing to do with the picture of sympathizing ophthalmia.

We should not adhere too strongly to the name "sympathetic ophthalmia." We retain it because it has been handed down, and because of our lack of knowledge concerning the exciting factors in the disease we have no newer, better name. The characteristic of the disease does not lie in the fact that the second eye becomes involved by the same inflammation after a shorter or a longer time, as the general term "sympathetic ophthalmia" would indicate. We should be slipping back to the error of the early ophthalmologists, long since corrected, were we to consider every double-sided iritis, for instance luetic or gonorrheal iritis, as sympathetic. The pathologic histology has given us the specific picture of the process. It is not tuberculosis, lues, gonorrhea or any known infection. However, it is just as unjustifiable to conceive of sympathetic ophthalmia as applied only to cases of perforating injury. It is surely conceivable that the old ophthalmologists, after they had finally freed themselves from the false idea that every disease of the second eye, irrespective of its nature, whether glaucoma or keratitis, etc., was sympathetic, limited the picture of the disease to iridocyclitis, which destroyed the other eye after a perforating injury of one eye. This definition was the result of sound clinical observations. Without the characteristic histologic findings being known, it was impossible to conceive of an identical disease arising without injury under other circumstances. It is no longer right to exclude this view, merely in consideration of the definition of the older authors, formed from incomplete data. Why should we adhere to the old view that the infective agent may invade the first eye only through a perforating injury? Have we any proof for this hypothesis? Why is it not sympathetic ophthalmia when an eye is lost through an iridocyclitis from a nonperforating sarcoma of the choroid and the other eye becomes blind from an iridocyclitis, and at the histologic examination I find the identical specific characteristic changes as I am accustomed to find in both eyes of known cases of sympathetic ophthalmia, in which one eye has sustained a perforating wound? A sarcoma of the choroid may become necrotic and call forth inflammatory changes as severe and extensive as imaginable. The eye may become shrunk, but so long as the typical form of sympathizing ophthalmia

does not arise, there will be no sympathetic ophthalmia in the other eye.

In an earlier work I advanced the supposition that the mode of infection in sympathetic ophthalmia appeared endogenously, that also the noxa of the disease, on this basis, appeared in both eyes simultaneously. We must also rid ourselves of another general notion that the mode of infection travels directly from the first eye to the second, either by way of the optic nerve, or the vascular or lymph tracts. Even our conception of metastatic transference is taken too narrowly. We can more easily believe both eyes to be diseased in a certain relation independent of one another. The noxa of the disease exists in the organism as a whole. By remaining in the one eye in which damage to the uvea has first prepared the way, it increases in intensity, or, as others have attempted to show, the uvea of the other eye has in some way become sensitized to the noxa. It now also becomes diseased by the noxa with which it was invaded simultaneously with the first eye. The conception of sympathetic ophthalmia, therefore, persists. The noxa already present in the second eye could only thereby incite an inflammation because the first eye was diseased. Had we, for example, removed the first eye in time, the second eye would have remained intact.

Until now we have had to accept the explanation that the uvea of the one eye had been damaged earlier to prepare the way for the development of this disease. I once made the statement that a previously sound eye could not primarily develop sympathizing ophthalmia. At that time we knew very little about the cases of spontaneous iridocyclitis with the picture of sympathizing inflammation here discussed in detail. In my studies at this time I passed over this without comment, as I was then of opinion that the presence of the characteristic picture in the one eye indicated that the other eye must also show clinical signs of the inflammation. Since then it has been shown that this is not true. I myself have examined cases of perforating injury which were enucleated because of the immediate danger of sympathetic ophthalmia and in which, indeed, the characteristic changes of sympathizing inflammation were present, without the other eye becoming diseased at that time or later. Therefore, it is of no importance that in known cases of idiopathic iridocyclitis with

the picture of sympathizing ophthalmia, only 66.6 per cent were connected with disease of the other eye. Therefore, the most important proof for the identity of these cases with real sympathetic affection does not fail, as I at that time thought.

Further, I must confess that after the study of these cases one can see a certain probability for their identity. It may be mentioned again, in order to avoid misunderstanding, that, with the material facts mentioned, as yet no conclusive proofs have been adduced. The explanation of how the disease originates in these eyes surely presents difficulties. There are two possibilities. The one coincides with that of typical cases after injury. Probably the eye first diseased has had an unsound uvea earlier. In my own case 1 there is no doubt of an earlier retinochoroiditis separate from the present affection. I have expressly mentioned this finding in the description. Also I have dwelt upon the contrast in Weigelin's case between the duration of the disease and the quite fresh sympathizing infiltration, without being in a position to draw further conclusions from the data at hand. The same is true for the case of Kitamura. On the other hand, in my case 2 I find no changes which would indicate presence of an earlier uveal disease of another character.

One must also consider the possibility that an eye with sound uvea may be affected by an especially virulent noxa of this disease. Then is the sympathetic character of the inflammation still more obscured in that both eyes are affected either simultaneously or within a very short interval. The course of the disease is then conceivably malignant.

In this sense I wish to take up the following case, of which unfortunately I have no anatomic preparations, and there is no positive proof for my assertions. But the clinical picture of the whole disease, and especially of the iris, afterwards, is so characteristic and so similar to my case 2, that the identity of the disease process is indubitable.

J. B., woman aged forty-six years. Anamnesis. March 5, 1912. Patient had seen well in both eyes up to four months ago and had never had any inflammation of the eyes. At that time, without any known cause, she developed an inflammation of the left eye which lasted two days. The eye was red, but not painful. The vision was good. One month ago a new inflammation occurred in the left eye, with marked sting-

ing sensation and severe headache; the vision rapidly became bad. For the past three weeks she has been treated in the clinic (atropin, aspirin). She has suffered from rheumatism for the past eight or ten years, which has remained limited to the right arm, and in fact to the region of the wrist and the upper arm, where circumscribed swellings are claimed to have been present. The last attack occurred in December, 1911, and lasted until February, 1912. At times she has a dull feeling in both forearms. Patient was pregnant seven times. The first child presented in the seventh month and died in eight months. The next six children were sound.

Status Presens, March 5, 1912.—Patient well nourished and of healthy appearance. Internal findings and urinalysis negative. Wassermann reaction negative. Tuberculin reaction negative.

O. D.: Normal; vision 6/6; fundus normal.

O. S.: Marked photophobia and epiphora. Marked conjunctival and ciliary injection. Cornea clear and bright; aqueous slightly cloudy. Anterior chamber of normal depth, iris gray green in appearance, and pupillary margin almost completely adherent to the anterior lens capsule. The pigment margin is torn here and there and spread out on the lens capsule. The pupil is horizontally oval, of irregular, jagged form and occluded by a gray exudate membrane. The membrane is somewhat thicker below than above. Eye is not sensitive to pressure and of normal tension. Counts fingers at one-half meter. Only a glimmer of red reflex obtainable. Because of the fact that secondary glaucoma in consequence of seclusio pupillæ developed the next day, an iridectomy was performed above with a Graefe knife (March 6, 1912). The anterior chamber was reformed on the following day. The severe inflammation of this eye, however, persisted.

March 18, 1912. A severe iritis developed suddenly in the right eye. Posterior synechiæ were formed already on the same day that the ciliary injection became noticeable. With marked photophobia and increasing ciliary injection the iris became much swollen and intensely green in color. The aqueous became cloudy and the synechiæ quickly increased in number. All treatment proved of no avail. In spite of energetic sweating and frequent use of atropin and dionin, secondary glaucoma developed April 23, 1912, in consequence

of *seclusio pupillæ*, and necessitated an iridectomy. This was performed on the same day. The inflammation ran a malignant course in both eyes, so that the vision was lost.

June 12, 1912. Patient left the hospital, at which time the findings were as follows:

O. U.: Marked conjunctival and ciliary injection. The operation scars at limbus above, smooth. The anterior chambers obliterated; iris tissue still thickened, structure entirely obscured. Pinhead pupils filled in by membrane. The colobomata hardly visible and likewise occluded by a membrane. Tension about normal. Vision, light perception at six meters; projection normal. The inflammation gradually subsided during the next few months, so that by November the eyes became quiet, but the projection was slowly lost.

The eyes showed a picture of the severest form of sympathetic iridocyclitis. Many deep vessels in the cornea. No chamber in either eye. The iris shows a peculiar light grayish red color with entirely obscured structure. The pupil and coloboma are drawn up and occluded by a gray membrane, which passes over into the pupillary margin. Both eyes soft.

With this work I wish to stimulate a special interest in cases of spontaneous iridocyclitis which, with a rather severe onset in otherwise apparently sound individuals, especially women, quickly lead to the worst results and often to complete blindness through involvement of the other eye. I believe we have been much too free during the past years with the diagnosis of tuberculosis as the etiologic factor in iridocyclitis. The tuberculin reaction is not always a positive proof of the presence of a tuberculous focus in the body.

Among others is a case of Fuchs', where an iridocyclitis was handled as tuberculous, though no traces of tuberculosis were to be found anywhere in the whole body at postmortem examination. Sometimes it may be possible to get an idea of the pathologic histology of such an iridocyclitis by the examination of the piece of iris removed at the iridectomy. However, we must not forget that the characteristic infiltration is often missing in the iris.

Unfortunately we have no characteristic clinical sign for this form of iridocyclitis. It is only after the cessation of the disease that the eye takes on the appearance often seen after sympathetic ophthalmia. In the initial stage it is im-

possible to differentiate clinically between an iris which is infiltrated in the highest grade and substituted by granulation tissue, from an iris which is only infiltrated in a moderate degree by round cells.

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1. Fuchs: Graefe's Archiv., Vol. 84.
2. Kitamura: Klin. Monatsblätter für Augenheilkunde, Vol. 45.
3. Weigelin: Graefe's Archiv., 1910, Vol. 75.
4. Brown: Graefe's Archiv., 1912.

EXPLANATION TO THE ILLUSTRATIONS ON PLATE 4.

Fig. 1 (Mag. 20x). Portion of the flat part of the ciliary body with ora serrata (Os). The outer lamellæ adjacent to the sclera are only slightly infiltrated, the middle lamellæ are full of lymphocytes. The pigment layer (Pi) is frequently broken through by the epithelioid cell infiltrate, whereby nodules (K) are formed immediately under the unpigmented cell layer (U). One nodule (Ki) has pushed forward under the ora serrata (Os).

Fig. 2 (Mag. 49x). At two places the retina (N) and choroid (Ch) have grown together. The latter is infiltrated with small cells (J), pigment layer (Pi) defective. Proliferation of the pigment epithelioid cells have formed a nodule of epithelioid like cells (E). Cn., Ciliary nerve.

Fig. 3 (Mag. 210x). On the inner surface of the nodular thickening of the retina bordered by the membrana limitans interna (Li) is a retinal precipitate (P). Only the outer nuclear layer (K) of the retina is still recognizable of the real retinal structure. (E) Groups of epithelioid cells.

Fig. 4 (Mag. 110x). Nodules in the sclera (S). The periphery is formed of lymphocytes (L), the center of epithelioid cells (E). At the border of the nodule two vessels (G) in cross section.

Fig. 5 (Mag. 60x). An infiltration nodule in the nerve trunk (O) near the pial sheath (P), consisting of lymphocytes (L) in the periphery and epithelioid cells (E) in the center.

Fig. 6 (Mag. 36x). Necrotic focus (N) at the end of the pars plana (P) of the ciliary body. The light zone around it consists of epithelioid cells with giant cells (R). Lymphocytes are present further in the periphery. Epithelioid cells form a heavy infiltrate round about.

PLATE IV.

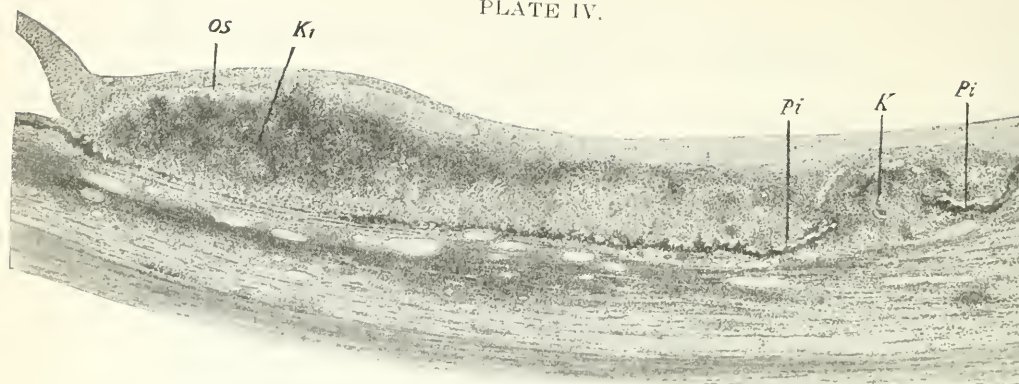


Figure 1.

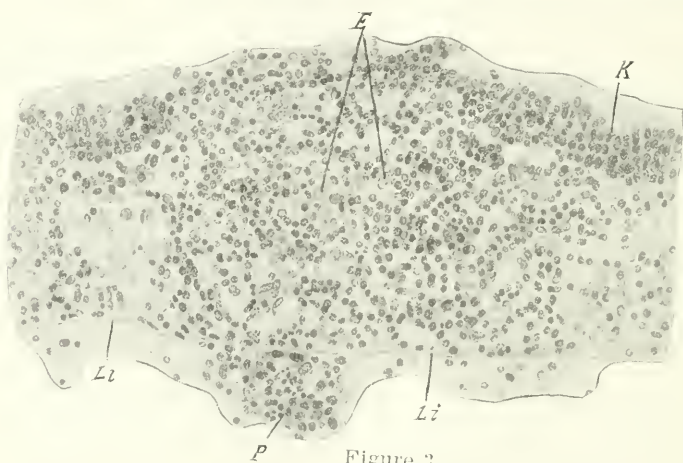


Figure 3.

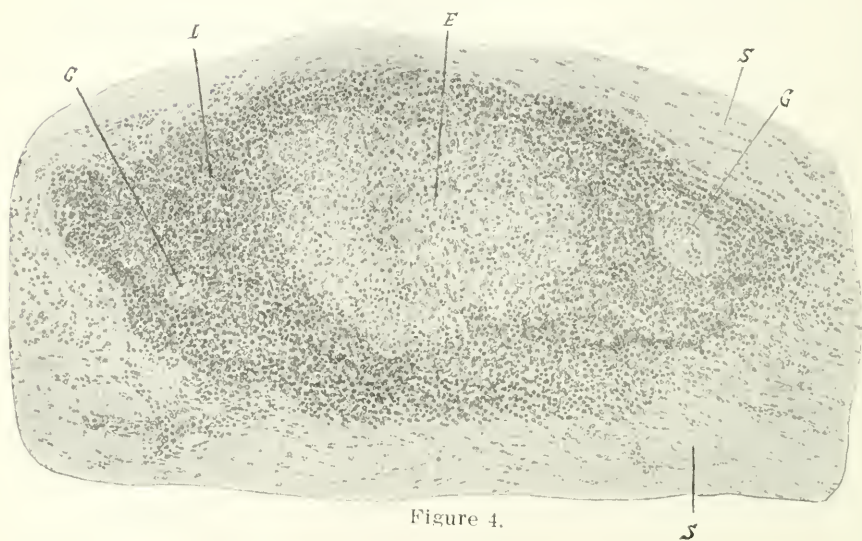


Figure 4.

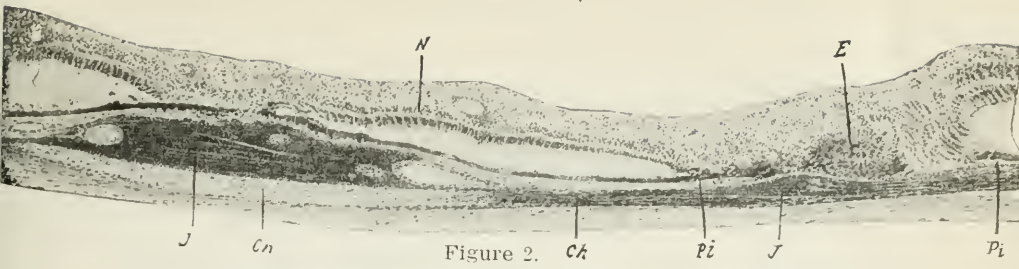


Figure 2.

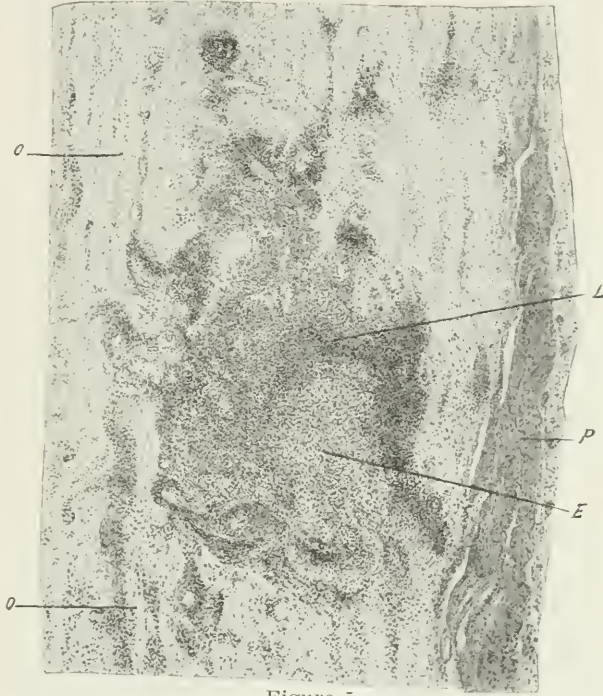


Figure 5.

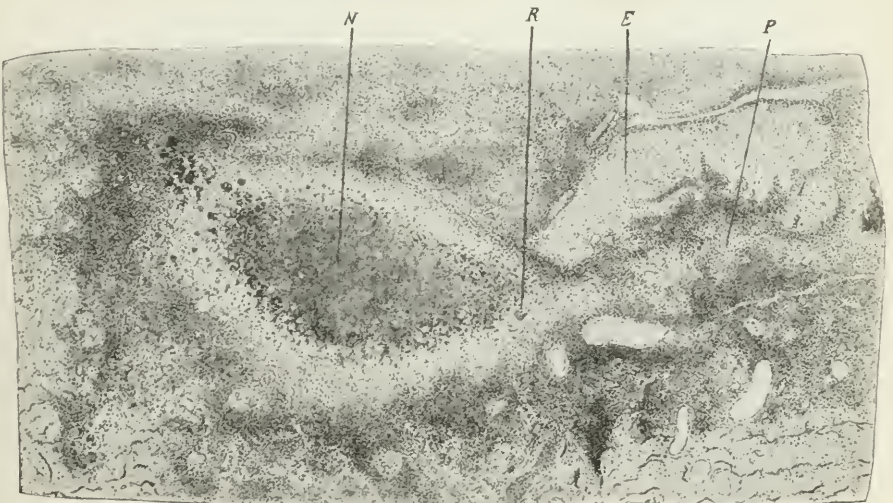


Figure 6.

X.

REPORT ON A SERIES OF FIFTEEN HUNDRED CASES OF ERRORS OF REFRACTION AND A BRIEF ANALYTICAL CONSIDERATION OF THE SYMPTOMS PRESENTED.*

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This paper which I have the honor to present before the Academy is a report on a series of refractions which I submit with the hope that I may be so fortunate as to either gain your approval or invoke such discussion that the end-result may be the same, a deeper research in the study of refraction and a further and more exhaustive study of the various phases of refraction which I shall discuss today.

This report is based on the case records of one thousand adults, private patients between the ages of eighteen and forty, all of whom are of a class in which close work is more or less excessive. These adults were all examined under the complete cycloplegia of homatropin and cocain, their histories carefully recorded and final reports have been obtained from all.

Cases in which there existed muscular imbalances of such magnitude as to be productive of symptoms are excluded from the report, and the findings submitted are composed of symptoms dependent on errors of refraction exclusively.

The second portion of this report comprises the findings in the examination of five hundred children between the ages of five and sixteen, who were examined under full atropin cycloplegia. As in the adults, only those cases are considered in which the difficulty is purely one of refractive error.

Your attention is first directed to summary sheet number one, which shows the comparative frequency with which the various errors were found in the series of one thousand adults.

*Read before the American Academy of Ophthalmology and Otolaryngology, October, 1914.

SUMMARY SHEET NUMBER 1.

Errors of Refraction in 1,000 Adults	Percentage
Compound hypermetropic astigmatia.....	34.1
Mixed astigmatia	23.6
Compound myopic astigmatia.....	23.5
Simple hypermetropia	8.9
Simple hypermetropic astigmatia	3.6
Simple myopia	3.6
Simple myopic astigmatia	2.4
Emmetropia	0.3

As you will note, in adults all forms of hypermetropia constitute 46.6 per cent of all errors. Myopia in its simple and astigmatic forms aggregate 29.5 per cent, and mixed astigmatia is found in 23.6 per cent of all the patients examined.

Let us now proceed to an analytical consideration of the various symptoms presented by these one thousand adults, taking each error separately. In the leading error of refraction found in adults, the following tabulation gives you at a glance the predominant symptoms and their frequency of occurrence:

CHART NUMBER 2.

Headaches—Compound hypermetropic astigmatia.

OTHER SYMPTOMS MOST FREQUENTLY MENTIONED.

Symptoms.	Percentage.
Rapid ocular fatigue.....	47.0
Tardy accommodation	9.3
Inadequate vision	11.4
Ocular pain	15.2
Palpebral irritation	34.7
Increased lacrimation	6.6
Photophobia	6.7
Nausea	6.1
Vertigo	3.2
Nervous irritability	22.3
Nervous depression	5.0

You will note that in compound hypermetropic astigmatia, the headache most frequently mentioned is the combined frontal

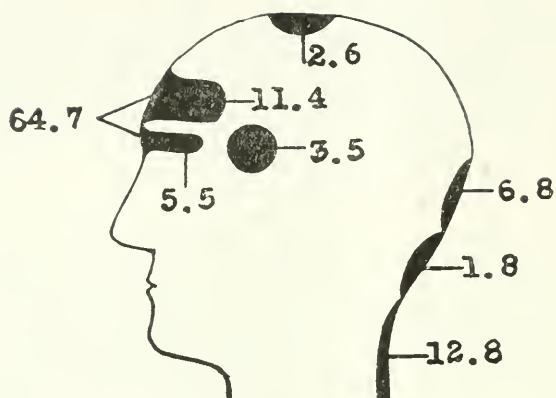


Chart No. 2.

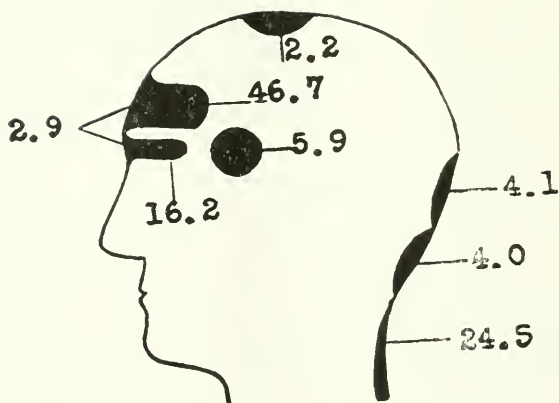


Chart No. 3.

and supraorbital, 64.7 per cent of all compound hypermetropic astigmies giving this form of headache as a leading symptom. In no other form of error of refraction is this headache present to such a degree, the nearest approach being in simple hypermetropic astigmatia, with a percentage of only 13.3. The next most commonly mentioned headache found in compound hypermetropic astigmatia is that in the nuchal region, the so-called "check-rein" sensation." I consider the frequency and constancy of this symptom to be noteworthy. All other headaches total but 31.6 per cent, less than half the percentage of the combined frontal and supraorbital.

Let us proceed to Chart number 3. This presents for your consideration the tabulated symptoms found present in mixed astigmatia, which was found to be the existing error in 23.6 per cent of all cases examined. The frequency of mixed astigmatia should be noted. Previous reports would indicate a much lower percentage, and I feel that the increase in the percentage is due merely to our improved diagnostic technic.

CHART NUMBER 3.

Headaches—Mixed astigmatia.

OTHER SYMPTOMS MOST FREQUENTLY MENTIONED.

Symptoms.	Percentage.
Rapid ocular fatigue.....	50.3
Tardy accommodation	5.7
Inadequate vision	11.5
Ocular pain	16.1
Palpebral irritation	28.4
Increased lacrimation	10.8
Photophobia	12.7
Nausea	8.8
Vertigo	4.3
Nervous irritability	34.5
Nervous depression	7.2

In mixed astigmatia there is found the most frequent mention of the isolated supraorbital headache. This is a comparatively infrequent symptom in the other forms of error of refraction. In mixed astigmatia the isolated supraorbital pain was noted by

16.2 per cent of these patients. The nuchal pain is present in 24.3 per cent, a higher percentage by 6.1 than is found in any other form of error. The presence of a well defined supra-orbital headache in conjunction with nuchal discomfort or pain can well be called characteristic if not pathognomonic of mixed astigmia. It is in this form of error that we find the greatest nervous manifestations present. More, however, will be said of that later.

In compound myopic astigmia headache is found in the frequency as indicated on Chart number 4.

CHART NUMBER 4.

Headaches—Compound myopic astigmia.

OTHER SYMPTOMS MOST FREQUENTLY MENTIONED.

Symptoms.	Percentage.
Rapid ocular fatigue.....	40.3
Tardy accommodation	9.0
Inadequate vision	24.8
Ocular pain	13.4
Palpebral irritation	38.2
Increased lacrimation	8.4
Photophobia	10.7
Nausea	5.6
Vertigo	2.3
Nervous irritability	30.8
Nervous depression	8.5

In compound myopic astigmia we find on analysis that the headache most frequently mentioned is the isolated frontal headache. Sixty-one per cent of all headaches given as a leading symptom of this error is well defined in the frontal region. In marked contrast the combined frontal and supra-orbital headache is present in but 1.6 per cent of the case histories, as against 64.7 per cent found in the cases of compound hypermetropic astigmia. Nuchal pain is mentioned by 16.4 per cent of all these patients. All forms of headache other than frontal and nuchal constitute but 30.4 per cent.

The next chart is illustrative of simple hypermetropia, the least significant of all errors of refraction.

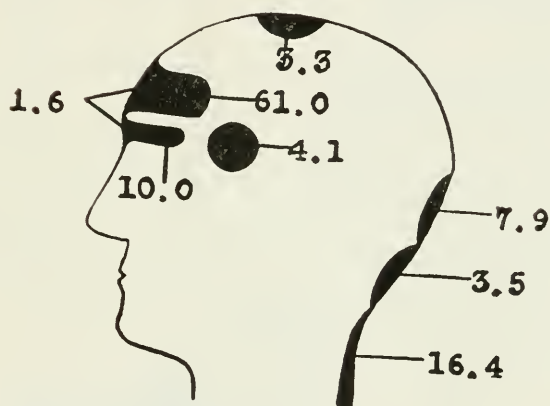


Chart No. 4.

CHART NUMBER 5.

Headaches—Simple hypermetropia.

OTHER SYMPTOMS MOST FREQUENTLY MENTIONED.

Symptoms.	Percentage.
Rapid ocular fatigue	44.5
Tardy accommodation	9.9
Inadequate vision	11.0
Ocular pain	16.7
Palpebral irritation	23.5
Increased lacrimation	4.4
Photophobia	13.3
Nausea	10.4
Vertigo	8.8
Nervous irritability	22.2
Nervous depression	0.0

As you note by Chart number 5, in the cases of simple hypermetropia we have a much more even distribution of all symptoms than in any of the foregoing charts. There is absent any characteristic preponderance of one form of headache as was found in the summarization of the other errors of refraction. Let us proceed to the consideration of the simple hypermetropic astigmatism.

CHART NUMBER 6.

Headaches—Simple hypermetropic astigmatism.

OTHER SYMPTOMS MOST FREQUENTLY MENTIONED.

Symptoms.	Percentage.
Rapid ocular fatigue	60.2
Tardy accommodation	12.4
Inadequate vision	3.8
Ocular pain	4.7
Palpebral irritation	46.7
Increased lacrimation	7.7
Photophobia	16.5
Nausea	9.6
Vertigo	7.7
Nervous irritability	35.0
Nervous depression	0.0

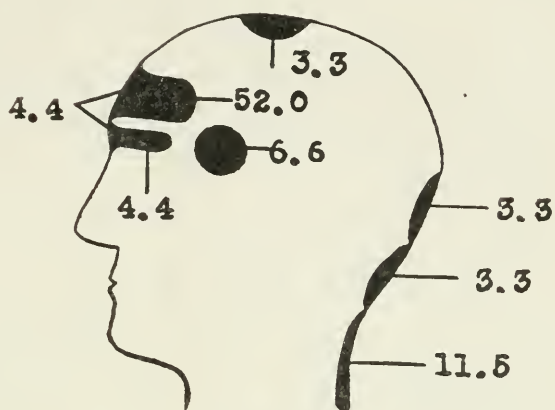


Chart No. 5.

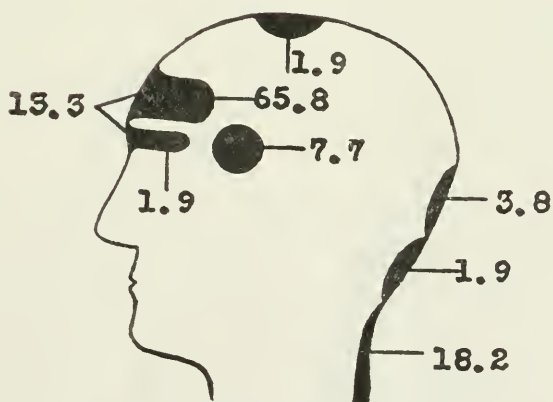


Chart No. 6.

In simple hypermetropic astigmatism, as is shown above, the isolated frontal headache is represented by the highest percentage found in the entire tabulation and, as you see, 79.1 per cent of all these cases mention pain in the frontal regions—that is, in the isolated frontal and the frontal and supra-orbital in combination. This is a higher total percentage than is found elsewhere. All other symptoms are fairly evenly distributed; but, as you see, we have a comparatively high percentage of nuchal pain.

CHART NUMBER 7.

Headaches—Simple myopia.

OTHER SYMPTOMS MOST FREQUENTLY MENTIONED.

Symptoms.	Percentage.
Rapid ocular fatigue.....	29.5
Tardy accommodation	15.7
Inadequate vision	74.3
Ocular pain	13.3
Palpebral irritation	25.2
Increased lacrimation	3.3
Photophobia	10.0
Nausea	6.7
Vertigo	0.0
Nervous irritability	0.0
Nervous depression	0.0

In simple myopia the comparative infrequency of headache is striking. Only about 25 per cent of all myopes examined mention headaches at all, and their headache was invariably described as being but a vague feeling of discomfort, usually supraorbital or frontal in character, never a combined frontal and supraorbital. It is well to note here that only in simple myopia and in simple myopic astigmatism do we find no mention made of the combined frontal and supraorbital headache. In this error alone is no mention made of any of the nervous manifestations.

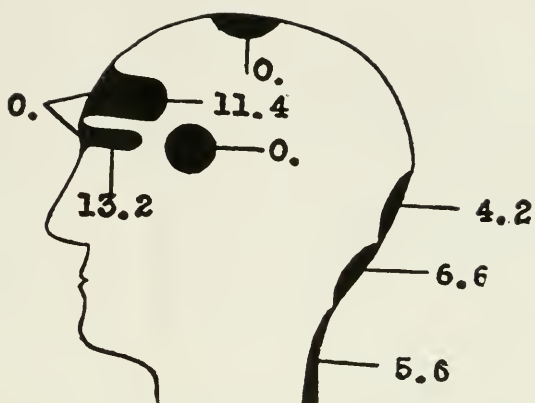


Chart No. 7.

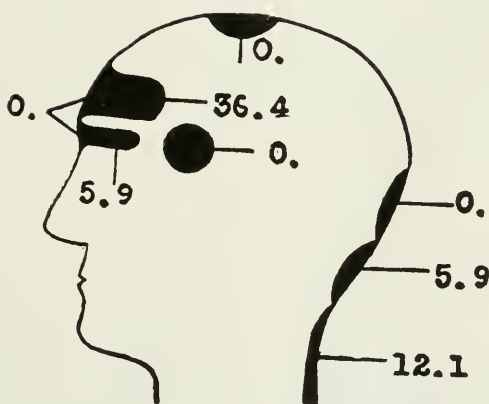


Chart No. 8.

CHART NUMBER 8.

Headaches—Simple myopic astigmatia.

OTHER SYMPTOMS MOST FREQUENTLY MENTIONED.

Symptoms.	Percentage.
Rapid ocular fatigue	26.4
Tardy accommodation	2.9
Inadequate vision	39.3
Ocular pain	0.0
Palpebral irritation	60.0
Increased lacrimation	18.2
Photophobia	12.0
Nausea	8.8
Vertigo	0.0
Nervous irritability	17.6
Nervous depression	0.0

In simple myopic astigmatia we note but slight difference from simple myopia, except that there is a very slight increase in the frequency of headache. This and simple myopia are the only errors of refraction in which no mention is made of vertigo.

The foregoing charts have shown you the symptom classifications in the various forms of error of refraction. For the purpose of more rapid comparison, I have prepared summary sheet number 2, a tabulation of all forms of headache in all errors of refraction.

SUMMARY SHEET NUMBER 2.

Error of Refraction	Frontal with Supraorbital	Frontal	Supraorbital	Temporal	Occipital	Vertical	Suboccipital	Nuchal
Simple hypermetropia	4.4	52.0	4.4	6.6	3.3	3.3	3.3	11.5
Simple hypermetropic astigmatia	13.3	65.8	1.9	7.7	3.8	1.9	1.9	18.2
Compound hypermetropic astigmatia	61.7	11.4	5.5	3.5	6.8	2.6	1.8	12.8
Simple myopia	0.0	11.4	13.2	0.0	4.2	0.0	6.6	5.6
Simple myopic astigmatia	0.0	36.4	5.9	0.0	0.0	0.0	5.9	12.1
Compound myopic astigmatia	1.6	61.0	10.0	4.1	7.9	3.3	3.5	16.4
Mixed astigmatia	2.9	46.7	16.2	5.9	4.1	2.2	4.0	24.3

Further discussion of this summary sheet is unnecessary. One point which I wish to emphasize particularly is the con-

stancy with which the nuchal pain, or check-rein sensation, is found present as a leading symptom of the errors of refraction. Even in simple myopia, which presents so few symptoms other than inadequate vision, we find this nuchal pain in 5.6 per cent of the case histories. The highest percentage, 24.3, is found in mixed astigmatia. The extent of this nuchal pain varies from a slight sense of discomfort in the nape of the neck to a severe pain extending well down into the dorsal region. It is a significant fact that in every case relief from this pain came from the use of the correcting lenses. Its frequency of occurrence demands for it recognition as a prominent symptom of eye strain.

In order of frequency, I found the headaches in these one thousand patients to be located as follows:

- | | |
|------------------------------|-----------------|
| 1. Frontal | 5. Occipital |
| 2. Nuchal | 6. Temporal |
| 3. Frontal with supraorbital | 7. Suboccipital |
| 4. Supraorbital | 8. Vertical |

I do not wish to give the impression that I am attempting to establish a symptom group index to errors of refraction, but it does impress me that this analysis has at least indicated that certain mechanical defects of the eye produce certain definite symptoms in a predominating percentage of cases, and that further study along the same line is warranted.

We will now proceed to a brief consideration of the symptoms other than headaches presented by these patients. Summary sheet number 3 presents in condensed form the summarized tabulations.

SUMMARY SHEET NUMBER 3.

Error of Refraction	Rapid Ocular Fatigue	Tardy Accommodation	Inadequate Vision	Ocular Pain	Palpebral Irritation	Increased Lacrimation	Photophobia	Nausea	Vertigo	Nervous Irritability	Nervous Depression
Simple hypermetropia . . .	44.5	9.9	11.0	16.7	23.5	4.4	13.3	10.4	8.8	22.2	0.0
Simple hypermetropic astigmatia	60.2	12.4	3.8	4.7	46.7	7.7	16.5	9.6	7.7	35.0	0.0
Compound hypermetropic astigmatia	47.0	9.3	11.4	15.2	34.7	6.6	6.7	6.1	3.2	22.3	5.0
Simple myopia	29.5	15.7	74.3	13.3	25.2	3.3	10.0	6.7	0.0	0.0	0.0
Simple myopic astigmatia	26.4	2.9	39.3	0.0	60.6	18.2	12.0	8.8	0.0	17.6	0.0
Compound myopic astigmatia	40.3	9.0	24.8	13.4	38.2	8.4	10.7	5.6	2.3	30.8	8.5
Mixed astigmatia	50.3	5.7	11.5	16.1	28.4	10.7	12.7	8.8	4.3	34.5	7.2

In this tabulation of symptoms other than headache there are a few points of interest which are of significance.

Rapid ocular fatigue is a very constant symptom, being least mentioned in simple myopia and simple myopic astigmatism, the greatest frequency being in simple hypermetropic astigmatism.

Tardy accommodation is found in highest percentage in simple myopia and lowest in simple myopic astigmatism.

Inadequate vision is, as would be expected, highest in simple myopia, followed by the myopic astigmatism. In the hypermetropia and mixed astigmatism, it is of negligible frequency.

Ocular pain in the highest percentage is found in simple hypermetropia, followed by mixed astigmatism, compound hypermetropic astigmatism, compound myopic astigmatism, simple myopia and simple hypermetropic astigmatism, in the order named. Ocular pain is not mentioned in simple myopic astigmatism.

Palpebral irritation in 66.6 per cent of all cases of simple myopic astigmatism is a prominent symptom. It is found in highest percentage in the various astigmatic forms of error.

Increased lacrimation, being largely dependent on lid irritation, is also found chiefly in astigmatic errors.

Photophobia is found rather evenly distributed.

The nausea herein mentioned is, as you remember, not dependent on muscular imbalances, and it is interesting to note its existence in all forms of error of refraction with relative constancy of percentage.

Vertigo also is fairly evenly distributed and constant throughout the series.

Nervous manifestations I have considered of sufficient importance to be charted separately, as is shown in summary sheet number 4.

This is a phase of eye strain symptomatology which is of greater importance than has generally been admitted. Gould was a pioneer in the exploitation of the nervous phenomena resulting from eye strain, and although his extreme deductions were not generally accepted, it cannot be denied that he established as truths what many had denounced as impossibilities. I think it is generally accepted now that nervous manifestations are among the most frequent and distressing of symptoms arising from eye strain.

SUMMARY SHEET NUMBER 4.

	Simple Hypermetropia	Simple Hypermetropic Astigmatism	Compound Hypermetropic Astigmatism	Simple Myopia	Simple Myopic Astigmatism	Compound Myopic Astigmatism	Mixed Astigmatism
Nervous irritability	22.2	35.0	22.3	0.0	17.6	30.8	34.5
Nervous depression	0.0	0.0	5.0	0.0	0.0	8.5	7.2

In this tabulation I wish, particularly, to call your attention to the absence of the depression type of nervous manifestation in all but the compound and mixed astigmias, and to the total absence of nervous irritability and depression in simple myopia. Seventy-five per cent of the patients whose nervous manifestations are here recorded have presented final reports of complete recovery from the nervous manifestations. The remaining 25 per cent are negative or only faintly positive. I have observed that the lower forms of astigmatic error are more prolific of nervous manifestations than are the gross errors of refraction. The gross errors result in such great reduction of visual acuity that nature very quickly realizes the futility of any attempt at correction. I am in accord with the contention that in those cases in which we find one eye with good visual acuity and the fellow eye with a gross error of refraction, the disuse of the weaker eye is frequently but a protective measure against the establishment of nervous manifestations, the inevitable sequel of ocular strain.

The next chart, summary sheet number 5, is a graphic presentation of the various errors as found in the series of five hundred children in comparison with the findings in the series of adults.

From this summary sheet very interesting deductions can be made. Your attention is first directed to column 1, which shows the per cent of normal eyes found in adults to be 0.3 per cent, or three out of the thousand cases reported. In children the percentage is 19.4, representing ninety-seven out of five hundred examined, or one hundred and ninety-four out of every thousand, as against three out of every thousand adults. In the simpler forms of error of refraction, simple

hypermetropic, column 2, simple hypermetropic astigmatism, column 3, and simple myopia, column 5, we find present a relatively high percentage in children and a low one in adults.

When we consider the more complicated forms of error, compound hypermetropic astigmatism, column 4, compound

SUMMARY SHEET NUMBER FIVE

		%	
1. EMMETROPIA		0.8	ADULTS
		18.4	CHILDREN
2. SIMPLE HYPERMETROPIA		8.9	ADULTS
		27.9	CHILDREN
3. SIMPLE HYPERMETROPIC ASTIGMIA		8.6	ADULTS
		14.0	CHILDREN
4. COMPOUND HYPERMETROPIC ASTIGMIA		34.1	ADULTS
		21.6	CHILDREN
5. SIMPLE MYOPIA		8.6	ADULTS
		6.4	CHILDREN
6. SIMPLE MYOPIC ASTIGMIA		2.4	ADULTS
		8.1	CHILDREN
7. COMPOUND MYOPIC ASTIGMIA		25.5	ADULTS
		1.6	CHILDREN
8. MIXED ASTIGMIA		25.6	ADULTS
		4.8	CHILDREN

myopic astigmatism, column 7, and mixed astigmatism, column 8, we observe that these conditions are found present in a high percentage in adults and in a low one in children.

It is self-evident that the normal eyes and those with the simpler errors assume in later life the more complicated forms

of refractive error. You will note that the increased percentage in the first, second, third and fifth columns is equaled by the loss of percentage in the fourth, sixth, seventh and eighth columns. In this computation there is found an error of 0.1 per cent. What excuse is there for allowing these ninety-seven children with normal eyes to become the victims of eye strain with its attendant handicap? There is no excuse. This transition from normal to abnormal is not a natural process, nor is it unpreventable.

Within one generation this chart would be greatly modified if we were but able to give these children's eyes a fair chance. It is a reproach on us as ophthalmologists that these simpler forms of error are allowed to develop into the complicated astigmatic forms. Our educational system in this country is largely at fault. No child should be permitted to enter the public schools until he is eight years of age. My observation in the study of errors of refraction in children leads me to believe that great harm is done during the sixth and seventh years, the first two years in school. Medical inspection of school children has accomplished vast good. In addition to that, there should be instituted in each city a corps of ophthalmologists to inspect the eyes of all children. Not a casual test chart examination, for I claim that normal visual acuity in a child means nothing, but there should be a thorough consideration of each child's case, made possible by careful observations recorded on special blanks by the child's teacher. A record of a child's deportment, mental, physical and nervous, is of far more diagnostic value than the usual test card measurement.

The children whose histories comprise this report were under very careful observation, and on specially printed observation sheets a record of all symptoms was noted. The tabulated symptom groupings of these five hundred children are practically negative, so far as the usual eye strain symptoms are concerned. Headache of a definite type was found so infrequently as almost to be conspicuous by its absence. There is no corresponding paucity of all the other usual symptoms, and the observation of subjective and objective symptoms was of such irregularity and vagueness as to render classification impossible. There is one exception to this negative report, and that relates to the nervous manifestations

observed. Over 70 per cent of these children presented either nervous irritability or nervous depression, and in 60 per cent of these cases complete relief came with the elimination of the eye strain. Many of these children suffered from what Dean Emerson of the Indiana University School of Medicine has described as the "painless headache," the psychic depression which is the equivalent of the headache. This psychic depression type is very frequently observed, and the following case history is illustrative of a great many cases which have come under my observation. I cite this not as an unusual case, but as a very common one.

R. S., February 8, 1913. Aged ten years. Nearly every afternoon Richard comes home from school, and after putting away his books he throws himself down on the davenport and cries. He will cry for from a few minutes to nearly two hours. He never complains of headache, his eyes do not hurt and he cannot give any reason for crying. The child is not supersensitive, his feelings are not easily hurt, his work in school, although poor, is not a cause of worry or mortification, and he gives no cause for crying, merely saying that he can't help it. This crying is not of the hysterical type in any sense of the word. No source of physical irritation is present. He rests well at night, but frequently has bad dreams, the same dream often recurring on successive nights. With the exception of nervous irritability and inability to concentrate, there were no symptoms available. On examination the vision in each eye was found to be 20/20. He was examined under atropin cycloplegia of four days' duration. Both fundi normal. The skiascopic examination revealed a low grade mixed astigmatism for which the full skiascopic findings were prescribed. The boy's recovery was rapid and uneventful, and at the present time, one year and eight months since the day of examination, there has been no return of symptoms.

Psychic irritation resulting from eye strain is a very common thing in the observation of all of us. This psychic irritation ranges in severity from a mild irritability to a form choreic in character, or in the extreme cases to a degree identical in onset and symptoms to an epileptic seizure. To relate these case histories would be but repetition of what you yourselves have observed.

Other than these observations, I admit failure to establish

any facts of importance. To establish scientific data of value means the careful study of thousands of cases instead of hundreds. However, the study of these five hundred cases has convinced me of two things: the constancy of nervous manifestations, and the inconstancy of all other symptoms generally recognized as being ocular in origin.

Before concluding this paper I wish to enter into some detail on the method of examination, mentioning only the departures from the usually accepted technic.

CYCLOPLEGICS EMPLOYED.

Solutions of atropin sulphate, 0.5 per cent, are used with children between the ages of nine and fifteen. For younger children the strength is proportionately lower. The process of atropinization extends over a period of four days.

HOMATROPIN AND COCAIN.

I find this combination dangerous and inefficient in children. In adults I am convinced that a disc containing $\frac{1}{50}$ of a grain of homatropin and cocain is sufficient, in the vast majority of cases, to produce complete cycloplegia in a period of time varying from twenty to sixty minutes. In less than 5 per cent of my recorded cases has it been necessary to increase this dosage. My method of determining the onset and progress of cycloplegia is that advocated by Dr. Lucien Howe in his work on "The Muscles of the Eye" (p. 157, vol. i). The observations of Straub, as quoted by Dr. Howe, confirm my findings in regard to the dosage required to obtain full and complete cycloplegia. My observations are at variance with Straub's in that I have secured complete relaxation of the muscles of accommodation in less time. This, in some measure, may be accounted for by the fact that Straub used homatropin alone, while in my experiments I employed it in conjunction with cocain hydrochlorid. The age of the patients doubtless influences the results. Among many of my confrères it is the custom to use a 2 per cent solution of homatropin and cocain, one drop in each eye at intervals of ten minutes, extending over the period of an hour. I believe that used in that manner there is a useless waste of time and homatropin, as well as an unnecessary amount of discomfort to the patient, resulting from the prolonged cycloplegia and

mydriasis. My contention probably will meet with opposition, but I believe that a series of carefully conducted observations will convince the most skeptical.

MYOTICS.

My routine practice is to employ physostigmin salicylate to counteract the effect of the homatropin and cocain. I can commend its use to you as being a great convenience to your patients, in that in proper dosage it restores the accommodative function in from ten to sixty minutes. From the standpoint of safety it constitutes a valuable precautionary measure. Three-fourths of the patients recover their ciliary activity in an average of thirty minutes following the instillation of the physostigmin. I have used it as a routine practice for five years, and thus far have observed no untoward effects in any case. Its use in young adults is not advisable, as it frequently causes an intense ciliary cramp with its attendant severe headache.

METHOD OF DETERMINING ERRORS OF REFRACTION.

When I first essayed the determination of errors of refraction I depended to some extent on my skiascopic measurements, modifying them, however, by the subsequent trial case examination. If the two methods were at variance I would abide by the lenses accepted at the trial case by the patient. Subsequent and final reports from a large percentage of my patients were unsatisfactory. In the course of time I was brought to the full realization of the fact that there is nothing more untrustworthy than your patient's visual judgment. With improvement and development of the technic of skiascopy I gradually became less dependent on the subjective tests. To-day I feel the skiascopy offers the only scientific and exact method for the determination of errors of refraction. The test letter, trial case method I believe to be a dangerous, unreliable method, and to substitute for your skiascopic findings a lens selected by your patient is but the casting aside of scientific accuracy, under your own control, for the unintelligent guesswork of your patient. Refraction without recourse to any subjective tests is to my mind the ideal method of determining errors of refraction, and the final reports which I have from patients examined and prescribed for by this meth-

od during the past seven years have convinced me of the absolute reliability of the objective determination of errors of refraction. In order to obtain results the most minute details of the science must be observed absolutely. Unfortunately most of our textbooks lead us to the conclusion that skiascopy can be mastered in a short time. An article in one of the medical journals states, "Refraction is easy to learn." I claim that scientific skiascopy demands a most thorough training and a more exacting technic than any of the specialties, and that the mastery of the intricacies of the art remains yet to be accomplished. My claims for this method are made in no conceit, for I possess no originality of method or appliances, but I do claim that anyone who will develop the technic of skiascopy will be rewarded by having at his disposal a method of correcting errors of refraction which will give him better results than by the subjective tests.

Further discussion would be a digression from the subject at hand, but I hope that what I have said may possibly stimulate interest in this most important branch of ophthalmology, and that scientific skiascopy may assume the importance which it deserves.

In closing I beg to call your attention once more to the summarized symptom groupings found present in adults, and to impress on you the constancy and frequency of the various indications of ocular strain; also to emphasize the importance of recognizing nervous manifestations as being the most constant symptoms of eye strain in children; and last, to ask your consideration of what I am convinced is fact, that the unscientific uncertainty of subjective tests must and will give way to the scientific precision of the objective method of determining errors of refraction.

XI.

A CASE OF ALTERNATING TRANSIENT MONOCULAR BLINDNESS ENDING IN COMPLETE LOSS OF VISION IN THE LEFT EYE.*

H. MAXWELL LANGDON, M. D.,

PHILADELPHIA.

The case to be reported is that of J. P. T., aged forty years, white, married, and by occupation a traveling salesman.

He first consulted me in September, 1905, complaining of very severe and frequent headaches, at least one a week and lasting about twenty-four hours. They were general in character, not connected with use of the eyes, nor had he any accompanying ocular symptoms. He had been refracted several times, and felt that the correction worn at that time, which he had had for five years, gave him clear vision, but that a change might benefit the headaches. He also said that at times he lost his sight and at other times saw double. On further questioning I found that he had attacks of monocular blindness lasting from three seconds to five or six minutes, the eyes being about equally affected; if there was any difference, he thought the left might be more frequently affected. He had been blind in both eyes simultaneously but once, the attack lasting about two minutes. As to the diplopia, it was transient and fleeting, occurring about once a day, one object being above and to the right of the other. This lasted usually about thirty seconds. The first thing he would notice in one of the blind attacks would often be a diplopia, the vision would then gradually become hazy until it was entirely gone, then a hole would appear in the fog, as he expressed it, and vision would gradually return. His central vision seemed always to return before the field would clear in the periphery. He had never had attacks of hemianopsia or scotoma scintillans, nor did a headache accompany the blind spells. His gen-

*Read before the American Ophthalmological Society, 1914.

eral health had always been excellent except for occasional attacks of muscular rheumatism in the shoulders and lumbar muscles. The attacks of blindness had occurred since early childhood.

On examination his eyes showed no external anomalies, the pupils and extraocular muscles being normal, and the conjunctivæ and corneæ clear. Central vision was: O. D., 6/12; c. c., 6/6. O. S., 6/15; c. c., 6/9. The muscle balance at six meters showed orthophoria in both the vertical and horizontal meridians; at thirty-three centimeters there were four degrees of exophoria with orthophoria in the vertical. Ophthalmoscopically the media were clear, the discs oval with clear margins and normal in color, with small central excavations. The retinal vessels were normal, the arteries showing no signs of sclerosis. The rest of the fundi was equally negative. There was no diplopia with a red glass, and the visual fields were normal. Under a cycloplegic he took,

O. D. + 1.25 S. \ominus + 1.50 cyl. ax. 95 = 6/5.

O. S. + 1.00 S. \ominus + 2.00 cyl. ax. 85 = 6/5.

This was ordered, less plus 0.50 S., for constant wear. At my request he had a general physical examination made by his family physician, which was absolutely negative as far as urine, heart and lungs were concerned. His blood pressure was one hundred and forty. His glasses seemed comfortable to him, the headaches seeming less frequent, though they still continued, and he was dismissed with the request that if it ever were possible to communicate with the writer or get to him during an attack he would do so.

Nothing further was heard from him until January 24th of the present year, when he reported with the statement that an attack had begun about eight o'clock the evening previous and had not cleared up, the eye still being blind, the left eye being affected.

Examination showed vision in right eye equaled 6/8, in left eye, faint light perception. The pupil of right eye was three millimeters, reacting normally; that of left eye was five millimeters, not reacting to direct light, but responding well consensually and to accommodation. The ocular motions were full and equal in all directions.

Ophthalmoscopically the media were clear in each eye, disc of right eye was normal in color and outline, the arteries were

good size, but with a slight increase in the reflex, some irregularity in caliber and slight indentations of underlying veins, the fundus was otherwise negative. Left eye had a disc which showed almost a complete loss of capillarity, the retinal arteries were in places mere threads, with here and there a small amount of blood remaining, the veins were very much reduced in size, the temporal portion of the retina was quite edematous, with a dark spot at the macula. There were no hemorrhages or other changes.

He was placed on nitroglycerin and inhalations of amyl nitrite, but without effect. His physician, Dr. S. A. Ward, wrote me concerning him at that time: "His heart has been very rapid, but I have not been able to detect a murmur. I have felt it was due to Bright's disease, but have repeatedly examined the urine, finding nothing wrong with it. He has been quite asthmatic, having to sit up part of the time to sleep. This seems entirely cardiac, as I can detect nothing wrong with the bronchi or lungs. His blood pressure is one hundred and ninety-five degrees, systolic."

Since then he had a complete cardiac collapse with failure of compensation which developed an aortic regurgitant murmur, edema of the legs to the groin, and great cardiac dilatation. Fortunately, he has made a very excellent recovery, the heart is again nearly normal in size, the edema has completely disappeared and, except for the blindness of his right eye, he is in fairly good condition.

Whether the loss of vision was due to an attack of vascular collapse in which the circulation failed of restoration, or whether it was from an embolus whipped from the diseased aortic valve, is possibly open to question. It would more likely be the former, from the history, for the attack differed in its incipient stage in no way from the hundred which had preceded it. The sensation of a fog hovering before him, with the gradual veiling of vision, was exactly what he was familiar with from former experiences, and he expected nothing but a gradual return to normal conditions. This return did not take place, in all probability owing to the thrombus formation in the closed artery with its intima roughened and sclerosed.

Transient loss of vision other than that due to an increase in extraocular tension, or acting as the ocular accompaniment of an attack of migraine, has been reported by many writers,

both in this country and abroad, several authors having had the opportunity of studying eyes while undergoing an attack from which there was complete recovery. Mauthner, Noyes, Benson, Sachs, Wagenman, Harms, Weiss, and Harbridge, whose patient was also studied during attacks by Zentmayer and de Schweinitz, have all had such good fortune. The account of the phenomena by each differs in detail, but in general terms is described as more or less complete ischemia of the retina, depending on whether all or only some of the branches of the artery were involved. The return of circulation is variously described as a "wave" or as "an advancing column," and synchronous with its appearance or immediately afterward vision returned, so there can be no doubt that the cause of the visual loss is failure of retinal blood supply; and as additional evidence of this, may be offered those cases where there has supervened permanent disaster after a series of transient attacks, where the picture is always one of a circulatory block.

Permanent blindness of an eye not preceded by transient attacks of visual loss in the organ affected, nor accompanied by such an attack in the fellow eye, is invariably ascribed to embolus or thrombus, but it seems difficult to conceive of such cause where the attacks are followed by entirely normal conditions, both as to function and appearance, and often after so many years. Some other reason for the failure of circulation must be offered to satisfactorily explain such conditions.

Leber, quoted by Priestly Smith, believed that these transient attacks of blindness are due to sudden diminution of the amount of blood in the retinal arteries from a slowing of the current. He thinks the sharp bend the vessel makes in passing from nerve trunk to retina, the absence of collateral circulation, and the resistance offered by the arteries, all tend to make the retinal artery very liable to such an accident.

Nettleship found valvular heart disease in both the cases studied and reported by him. He believed that the explanation for the arrest of the blood stream to the retina, which he felt was the undoubted cause of the blindness, was the fact that the central artery of the retina was a small terminal twig of the ophthalmic, and the latter was given off from the internal carotid at a right or even an obtuse angle, and that anything which tended to narrow the lumen of the retinal artery could easily shut off the weak stream.

Von Graefe saw a bilateral case where he believed the circulatory failure was caused by the difference in intraocular tension and the pressure of blood in the vessels. He performed a bilateral iridectomy with complete restoration of sight.

Mauthner proposed doing an iridectomy in his case, but before he could prepare his instruments and operate, vision returned.

Loring, in an article in *The American Journal of the Medical Sciences* for 1874, reports two cases in connection with other forms of circulatory disturbance, and states his belief that the vessels become empty from lessened heart action.

Werner, in an article on "Vascular and Other Retinal Changes in General Disease," read before the Ophthalmological Society of the United Kingdom last year, says: "Another theory of causation which formerly met with very general acceptance in cases of the kind is that of spasm of the central artery or of its branches. In view of the pathologic findings, however, there is no longer any necessity to assume the presence of spasm, and pathologists seem averse to accept this explanation. There is no doubt of the possibility of the occurrence of spasm, but it is difficult to prove its existence apart from experiment. The evidence in its favor, so far as the retinal arteries are concerned, is based partly on the ophthalmoscopic appearances observed during the attacks and partly on analogy."

"The phenomena observed during the course of the reestablishment of the circulation in the vessels when the attack is passing off, can in most cases be explained on mechanical principles as easily as on the assumption of arterial spasm, but the appearance of a constriction traveling like a peristaltic wave towards the periphery of the fundus is difficult to account for except in this way. In the opinion of some (Reimar, for instance), these descriptions of the ophthalmoscopic appearances are really due to a wrong interpretation of the phenomenon known as visible streaming, produced by the agglutination of the corpuscular elements of the blood in a stagnant current. The argument from analogy is drawn from cases accompanied by symptoms of Raynaud's disease and from cases of migraine. But in neither of these classes of cases has it been proved that spasm actually occurs, although

it seems to afford a natural and simple explanation of these diseases. Raynaud's supposed detection of spasm in the retinal vessels in some of his cases was not corroborated by Panas, who also examined them; besides, in the majority of the cases of Raynaud's disease, it appears that the vessels are diseased."

Werner accounts for the emptying of the retinal arteries by a drop in blood pressure lessening the *vis a tergo*, which is no longer able to force the blood through the narrow lumen of the diseased artery, he assuming that the arteries of all with such attacks are sclerosed. He thinks the length of time the

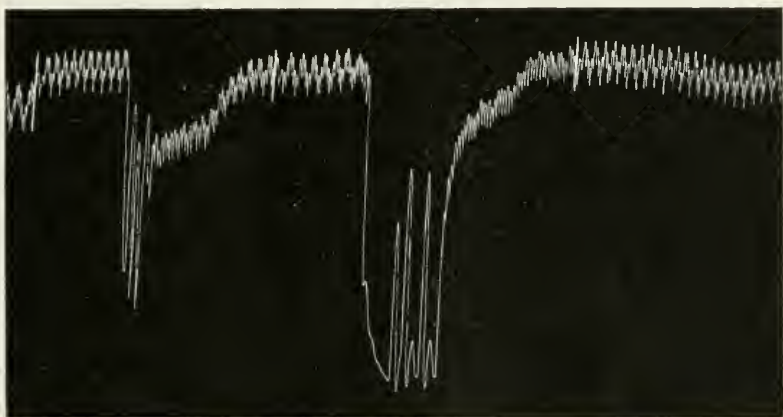


Fig. 1.—Fall in pressure due to vagus stimulation.

blood pressure remains below its former level determines whether the attack will be transient or permanent.

Of the reporters of cases who have had opportunities of examining their patients during attacks the majority seem to think the condition is one of spasm of the vessels; thus Wagenmann, Benson, Harbridge, Zentmayer, who saw Harbridge's case, and de Schweinitz, who studied the same case during an attack, and who said in discussing it: "The exact pathologic condition is to a certain extent a matter of conjecture, but certainly it would seem that the phenomena are best explained by assuming the presence of a spasmodic contraction of the walls of the artery," and he quoted observations of Schnabel and Sachs in partial real obstruction of an

artery as proving that here the spasmodic contraction of the walls of the artery was a factor in interrupting circulation.

Werner feels that those who depend on analogous conditions to support their claim that arterial spasm empties the vessels rather than that they passively collapse, being deprived of their contents by failure of the blood stream, are calling to their aid a weak argument. But is Werner fair in his description and consideration of the analogous conditions? He says the vessels are usually sclerosed in Raynaud's disease, and seems to think this is averse to the production of spasm. Oppenheim thinks that here the condition is most probably

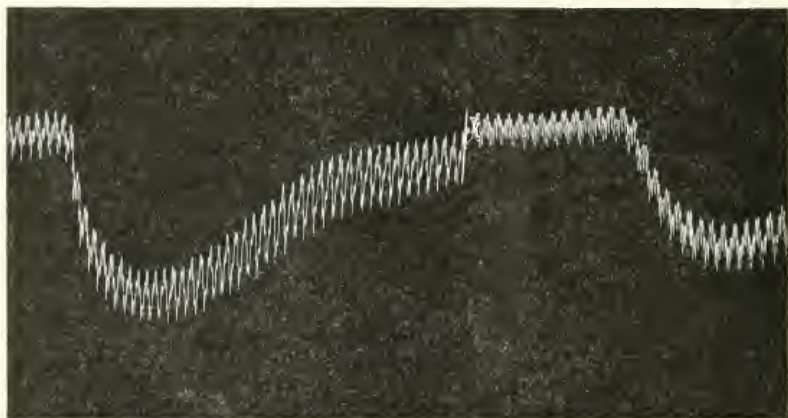


Fig. 2.—Fall in pressure due to inhalation of amyl nitrite.

produced by spasm, endarteritis being present in some cases. When one recalls the clinical changes in parts affected in Raynaud's disease during a paroxysm, the pallor, the shriveled glossy skin, the absence of bleeding on trauma, the paresthesia, the severe pain, all finally either disappearing without other signs or being followed by cyanosis and possibly gangrene, surely spasm rather than passively empty vessels seems the more likely cause. And if there be spasm here, why not in the retina?

Let us consider that unusual symptom complex known as intermittent claudication or limping, first recognized in horses and later studied by Charcot in man. The attack appearing suddenly with pain and fatigue in one leg without objective

signs, after a little rest the trouble clearing up, Charcot showed that it occurred in subjects whose iliac and crural arteries are the site of sclerosing and obliterating arteries, and believed that possibly a failure of nutrition of the muscles took place, and felt, as does Oppenheim, the attack is probably produced by spasm of the vessels. If spasm takes place here, why not in the retina?

And last, but far from least, either as evidence or in importance, is that peculiar condition for which so frequently advice and relief are sought in the office of the ophthalmologist—migraine. To enumerate the more common symptoms here is needless, but there are certain manifestations which suggest a course of events in some cases similar to that of these cases of transient blindness from circulatory interruption:

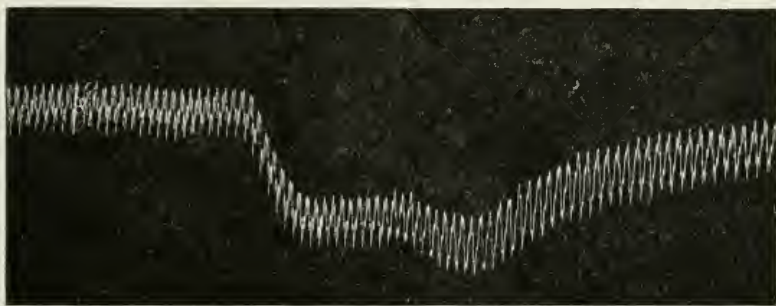


Fig. 3.—Fall in pressure due to injection 3 minims of 1% nitroglycerin.

First, the cases where there have been many attacks of migraine with functional derangement, hemianesthesia and aphasia especially, which culminated in an attack which did not clear up, but became permanent, closely paralleling the periods of visual loss in the writer's patient, and the final permanent defect; next, the cases where a typical organic lesion of some portion of the brain has been simulated many times—for example, one of Oppenheim's, where a typical cerebellar symptom complex was produced; third, those cases of transient blindness associated with migraine and transient diplopia in the same subject, as in the case just reported, making it seem possible that contraction of different vessels occurs at different times.

As additional evidence, pointing toward spasm rather than

a drop in blood pressure as the etiologic factor in these cases, may be considered the therapeutic results in one of Noyes' patients: a man, blind in both eyes for sixteen hours, with very typical fundus changes, who completely recovered in twenty minutes following inhalations of amyl nitrite, a drug which relaxes capillaries and lowers blood pressure from the first whiff inspired.

Let us now consider briefly the explanation advanced by Nettleship and Leber, and in a modified form by Loring and Werner. Nettleship and Leber each believed that the abrupt diminution in size of the blood stream from the internal carotid to the ophthalmic, as well as the abrupt turn made in changing its course, had a decided retarding effect on the flow, and a narrowed lumen of the central artery might be sufficient

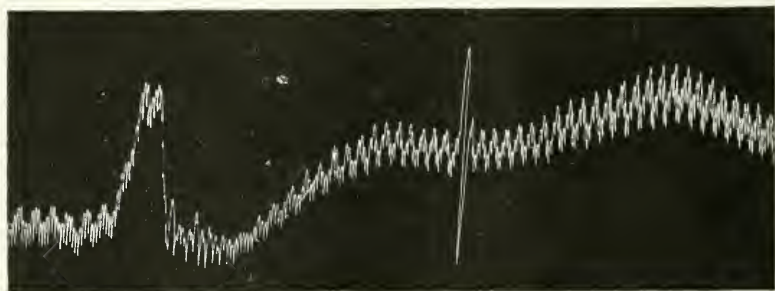


Fig. 4.—Increase of pressure due to 1 cc. of 1-1000 adrenalin chlorid.

to block the stream enough to empty the vessels; then a change in relations would again occur, and the blood, with pressure behind and little or none in front, would surge forward and again fill the vessels.

Loring and Werner seem to think that anything which produces a sudden fall in blood pressure will tend to empty the retinal arteries, and a return to normal pressure will once more fill them, the duration of the attack being decided by the duration of the drop of arterial pressure. But changes in blood pressure sufficient to produce such a profound circulatory change would surely produce more general symptoms, and would not be confined to one or both of the retinal arteries alone. The writer recently had the opportunity of studying a patient whom he had seen some months previously with a

blood pressure of two hundred and thirty and very decided fundus alteration, edematous discs and blurred margins, advanced arteriosclerosis and many superficial splashes of retinal hemorrhage. In the interval the man had passed through an attack of paratyphoid fever. On recovery his blood pressure was but one hundred and sixty, accompanied by weakness, vertigo and great cerebral discomfort. The edema of the disc was completely gone, the margins were quite clear, the retinal hemorrhages were absorbed, and nothing but the sclerosed vessels were left of the previous picture, but he was much more uncomfortable than before, and not until the blood pressure gradually reached its former high point did he cease to complain. If a gradual change produces the great dis-

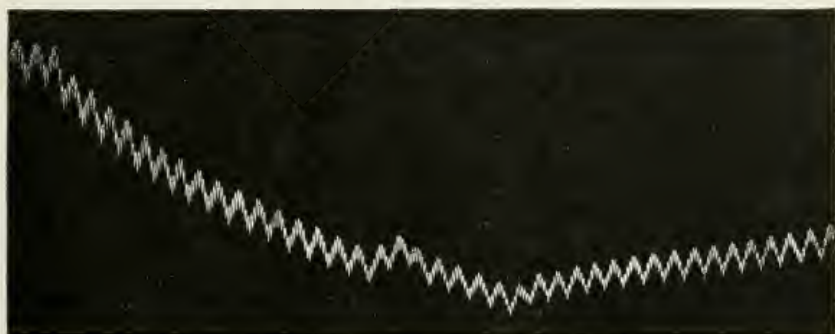


Fig. 5.—Fall in pressure due to removal of 300 cc. of blood.

comfort observed in this case, how much more would a sudden drop disturb the general economy? And yet many of these patients pass through dozens of attacks with no general symptoms worthy of comment. In none of the three cases reported by Posey, nor in the writer's case, were there any general symptoms during an attack. Blindness came and went, and except for the visual loss, they suffered absolutely no discomfort for a drop in blood pressure of such magnitude, and it would seem of necessity to be a drop equal to many millimeters of mercury. To so limit this effect seems almost incomprehensible and to border on the impossible. What is needed is a blood pressure reading of a patient during an attack, and the writer doubts that there will be much departure

from the mean average of that patient—indeed, a slight increase would not be surprising.

As in many other conditions which have undetermined causes, it may be that more than one explanation is the true one, and that both spasm and pressure alteration play a part.

If we study the reports of the cases, we find that they divide themselves, rather loosely, to be sure, and yet with fairly clear demarcation, into two groups: the one, and by far the larger, in which the first attack occurred about or after middle life, where on the first examination signs of general cardiac, vascular and renal involvement were found. Here the attacks possibly may be caused by a slight drop in blood pressure, with a retinal artery of much lessened lumen. But there remain several cases, one of Loring's, beginning at twenty years of age; Dewey's case, cited by Posey, where the attack began at eight years of age and culminated in complete visual loss in one eye at thirty-nine; in Priestly Smith's case, of a woman aged twenty-four, in whom ovariectomy stopped the attacks; in his case of a woman, aged twenty-five, where both eyes were completely blind during an attack, with no fundus changes at the intervals; and in his third case, that of a woman, aged eighteen, who had transient losses of only the lower half of the right visual field, with no fundus changes during the intervals; and in the early life of the writer's case, for even up to eight years ago there were no ophthalmoscopic or clinical signs of arterial degeneration; and possibly Benson's case may be grouped with these, for his attacks began when he was twenty-eight, and there was but slight arteriosclerosis; later he developed a toxic amblyopia. Surely in these cases it would seem some explanation other than blood pressure alteration is required.

The writer believes that possibly the course of events may be somewhat as follows: Some congenital anomaly in the vasomotor mechanism (none of these cases have been related, as far as known, but a tendency to migraine is most certainly a familial condition) and some process producing spasm through the ill arranged nervous control, either reflexly, as in Priestly Smith's case, cured by ovariectomy, or by direct toxic action, as in Benson's case, which later developed tobacco amblyopia. Indeed, in the other group the toxic agent which produced the sclerosed arteries may in the early course of events have set them in spasm.

Through the kind assistance of Dr. C. H. Plant and Dr. W. G. Wood of the Department of Pharmacodynamics of the University of Pennsylvania, the writer was able to make a series of experiments on the effect of sudden alteration of blood pressure on the retinal blood vessels of a dog. The animal was a young male, weighing ten kilos, and the work was done under ether anesthesia. The right femoral artery was opened and a canula attached to a mercury manometer was inserted. The stimuli used to produce the pressure changes were, first, electric stimulation of first one and later simultaneous stimulation of both pneumogastric nerves, producing a drop in blood pressure, first of forty-five per cent, and in the second instance of fifty per cent, without appreciable effect on the retinal vessels; second, inhalations through the tracheal tube of the contents of an amyl nitrite pearl, with a drop in pressure of fifty per cent, repeated in five minutes, followed by a drop of twenty-five per cent, with very slight pulsation of retinal vessels, but no other appreciable changes; third, three minims of a one per cent solution of nitroglycerin into the left femoral vein, with a drop of thirty-three per cent pressure, but no changes in retinal circulation; fourth, one cubic centimeter of a 1 to 1000 solution of adrenalin chlorid was injected into the peripheral end of the left carotid artery, with abrupt rise of twenty-five per cent in pressure, but no changes in the retinal vessels, the left eye being under observation; fifth, three hundred cubic centimeters of blood were withdrawn from the left femoral artery, with gradual fall in blood pressure of sixty per cent, but without noticeable changes in the retinal vessels. The writer's observations with the ophthalmoscope were confirmed by those of both Dr. Plant and Dr. Wood.

It seems to all three quite impossible that the changes in general blood pressure produced could have failed to have caused symptoms of collapse in a conscious animal, and it also seemed unlikely that, in an individual with normal arteries, a drop in blood pressure alone could empty the retinal vessels without the production of other symptoms.

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XII.

A RESUME OF THE TRACHOMA BODIES AS THE ETIOLOGIC FACTOR IN TRACHOMA AND IN THE SOCALLED INCLUSION BLENNORRHEA.*

F. W. ALTER, M. D., AND WILLIAM O. BONSER, M. D.,

TOLEDO.

Ever since Halberstaedter and Prowazek¹ published their article in 1907, which dwelt on the subject of cell inclusions, now more or less associated with trachoma, there has been considerable research work done on this subject.

Halberstaedter and Prowazek described their findings as follows: "Staining with Giemsa's method, smears taken from a trachomatous conjunctiva displayed dark-blue, granular inclusions lying in the cytoplasm of the epithelial cells.[†]

"At first these were small, round or oval, but appeared to develop into less decidedly staining granules containing fine red rod-like points, these latter (i. e., these less decidedly staining granules) increasing in number at the expense and eventual elimination of the original blue masses."

These bodies were called Prowazek bodies. Prowazek regarded the red bodies as the etiologic factor of a trachomatous infection, and explained the blue bodies, which he named plastin, as a reaction product of the epithelial cell after invasion by the virus, the red bodies.

As the red bodies increased in number, the blue bodies, or plastin, decreased, indicating a triumph of the red bodies over the epithelial cell.

The author sought to establish these findings as evidence not only of a characteristic pathologic entity in trachomatous infections, but also as the definite causal factor.

*Read before the American Academy of Ophthalmology and Otolaryngology, October, 1914.

[†]The illustrations accompanying this article are from sketches made from specimens secured by us from cases of chronic papillary trachoma with acute exacerbations; stained by Giemsa's method.

Shortly after this, articles appeared by other observers reporting the presence of typical Prowazek bodies in smears taken from cases of ophthalmia neonatorum of nongonorrheal origin. Haymann,² in 1910, published notes of their occurrence in four cases of gonorrheal ophthalmia neonatorum and was of the opinion that the cell inclusions were as much a reaction product to the Neisser gonococcus as to a trachoma virus. In any case, he stated that they were not typical of trachoma alone; but of this more anon.

It is a well-known fact that quite a large percentage of cases

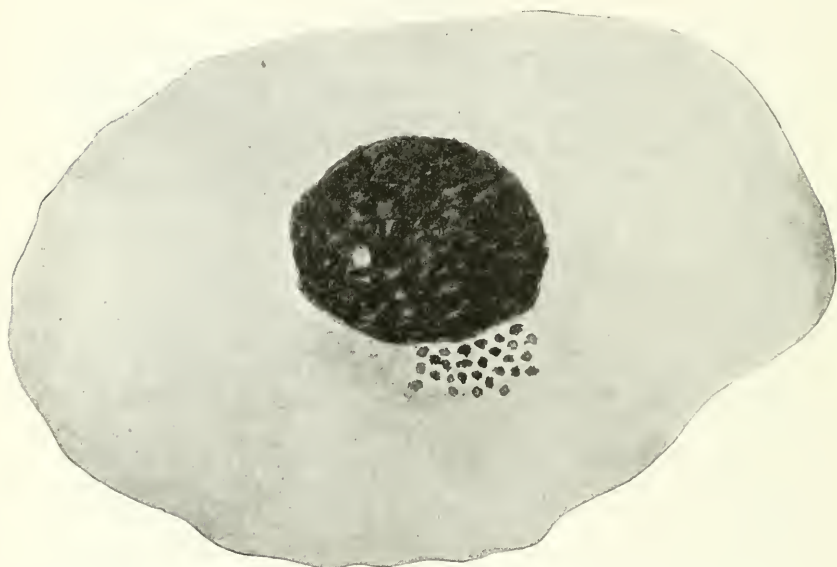


Fig. 1.—This is a characteristic appearance of the trachoma bodies in an epithelial cell in an early stage. They lie in the protoplasm of the cell in intimate relation to the nucleus.

of ophthalmia neonatorum are not associated with the gonococcus or with any other recognized organism.

Mr. Sidney Stephenson³ (London), in a recent paper at Oxford, gave as the average percentage of organisms isolated in ophthalmia neonatorum as follows: gonococcus, 65 per cent; pneumococcus, 10 per cent; bacillus coli communis, 5 per cent; other organisms (staphylococcus, Koch-Weeks, etc.), 5 per cent; total, 85 per cent; in 15 per cent no organisms could be identified.

It is with regard to these cases of ophthalmia neonatorum in which no organisms can be isolated that we are at present interested.

Lindner¹ and others investigated this type of blennorrhea and proved to their satisfaction that the typical Prowazek bodies were demonstrable in nearly every case, whereas they failed in the great majority of cases to find them in cases of ophthalmia neonatorum in which Neisser's gonococcus could be identified. After this investigation Lindner called this form of infection INCLUSION BLENNORRHEA.

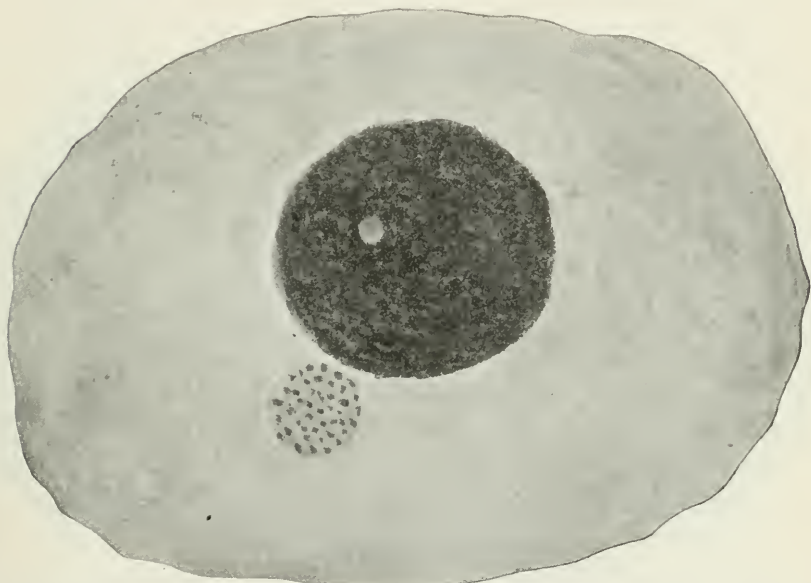


Fig. 2.—This stage shows the chlamydozoa appearance of the trachoma bodies.

Observers also described these cell inclusions in smears taken from chalazia, but more familiarity with the subject of cell inclusions showed that these cell inclusions were of a distinct type and could be identified from the cell inclusions occurring in trachoma and in inclusion blennorrhea. The inclusions in trachoma lie in intimate relation to the nucleus of the epithelial cell and form a distinct compact group of granulations, while those of chalazia are scattered through the cytoplasm and are not in definite relation to the nucleus of the epithelial cells.

In 1910 Lindner³ convinced himself that the so-called plastin (blue bodies) was but a particular stage of the life history of the virus (red bodies). In his careful preparations he found sharply defined round cocci-like bodies, taking the blue stain, in the cytoplasm of the epithelial cells. They occupy an apparently open space or cavity in relation to the nucleus as described above, and on high magnification are found only toward the wall of these cavities. Also, as these blue bodies appear to increase in number, the fine red rod-like bodies make their appearance. The blue bodies, formerly named plastin, he

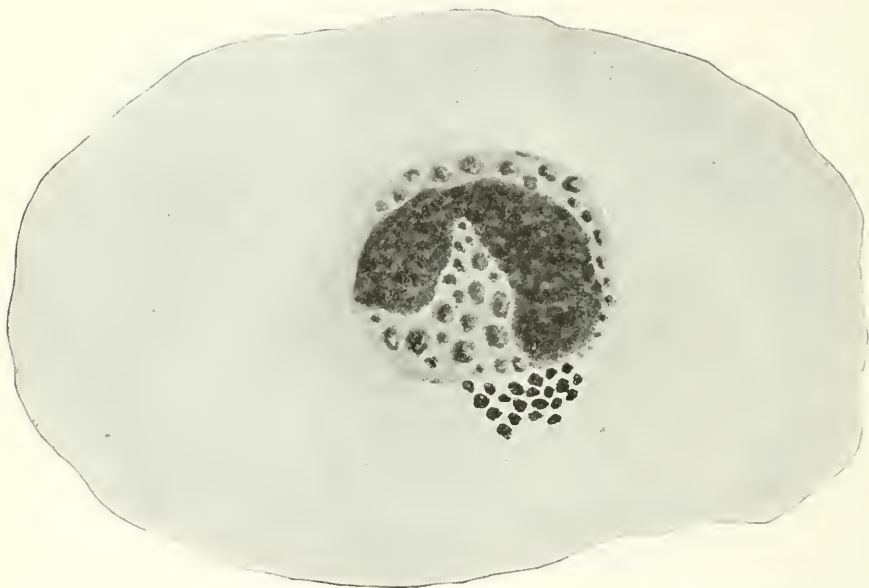


Fig. 3.—Shows a final stage after the trachoma bodies have invaded the nucleus. This causes the death of the epithelial cell.

termed initial bodies. He found them in an intra- and extra-cellular distribution.

At this stage, then, it had been established that these bodies occur in trachoma and in nonbacterial blennorrhoea; the question thereupon arose, is the virus one and only one?

Further investigation went to prove that in a number of cases of inclusion blennorrhoea, the cell inclusions could be found in smears taken from the vaginal mucous membrane of

the mother and could be found in smears taken from the male urethra of a certain type of nongonorrheal urethritis.

The conjunctiva⁶ of monkeys was inoculated with some of this material obtained from the vagina and urethra. In nearly all cases the investigators reported the appearance of a conjunctivitis similar in reaction to that of trachoma.

And here Lindner calls attention to a very important point. In the inoculation of monkeys with this virus he found the typical trachoma bodies. As monkeys cannot be inoculated with the gonococcus or any organism causing conjunctivitis, except the cell inclusions, this proves the independence of the infection.

Lindner thinks that the inclusions are living organisms, and believes that the genital affection in man and woman and inclusion blennorrhea are identical.

Woburn inoculated two men with inclusion blennorrhea discharge and produced a genuine trachoma. In Fuchs' clinic similar inoculations produced a like result. Histologic investigations indicated practically similar pathologic appearances in trachoma and in inclusion blennorrhea.

The inclusions have been found associated with gonococci, pneumococci and streptococci in the infant, but this may be a mere association, explained as being a mixed infection. The inclusions have been found in a variety of diseases, including epitheliosis desquamativa, swine pest, and spring catarrh.

To quote Lindner's article, in defense of the above statement, *The Trachoma Question*, *Arch. Ophthalm.*, xxi, 1912: "To this it may be replied that similar organisms are always discovered when a new virus is found, and the trachoma virus is no exception to this general rule. But it is not possible to inoculate monkeys with the inclusions in swine pest and other forms of conjunctivitis, except with the cell inclusions of the so-called inclusion blennorrhea."

Lindner believes that the virus belongs to the class protozoa, and further states that he agrees with Prowazek in that the red rod-like bodies are alive and the causal agent of trachoma. Prowazek⁷ used the term chlamydozoa (zoa, an animal, chlamy, an outer covering) because the inclusion appeared to be surrounded by a coat.

Herzog⁸ explained the bodies as degenerated gonococci, a species of involution form. Williams regarded them as de-

generated forms of the Koch-Weeks bacilli; others held them due to products of degeneration of a still undetected agent or of a parasitic nature but as yet unidentified.

Noguchi⁹ and Cohen¹⁰ have come to view these bodies as a definite pathogenic organism, and they agree with the previously mentioned belief of Lindner that the trachoma virus and that of inclusion blennorrhoea are identical. They further hold that the occasional occurrence in gonorrheal conjunctivitis was an accidental coincident which could not be explained by the transformation of the gonococcus into trachoma bodies, nor could the two factors operate to produce typical trachoma.

They arrived at this conclusion when they succeeded in growing the organism (the red bodies) outside the body, adopting cultural methods of a complicated nature and similar in some respects to those employed for the growth of the *spirocheta pallida*.

The above statements by Noguchi and Cohen, concluded after much work, entirely contradict Haymann's statement that these cell inclusions are found in gonorrheal conjunctivitis. It is true that the gonococcus and trachoma bodies may be present in the same case, operating to produce an acute form of ophthalmia. This may explain in part the source of error and difference by these observers.

DISCUSSION.

DR. F. W. ALTER, Toledo, Ohio (closing discussion): There are some points which we would like the privilege to dilate on briefly. First, I wish to call attention to the fact that the trachoma bodies assume a variety of forms. They most often take on a diffuse form, but there is a disposition towards a spherical shape.

Second, the trachoma bodies are always in close proximity to the nucleus. This will be found to be constant in character and is of diagnostic and of identification importance.

Third, there is a tendency of the trachoma bodies to surround and invade the nucleus. This occurs in two ways, by a direct frontal attack and also by a sort of flanking movement.

Fourth, there is a gradual elimination of the plastin or blue bodies and a triumph of the red bodies and an invasion of the nucleus and final disintegration and death of the epithelial cell.

Fifth, it is stated that aside from the nongonorrheal type of ophthalmia neonatorum, namely, inclusion blennorrhea, where we find the trachoma bodies, as well as in true trachoma, these cell inclusions are found in a variety of other diseases. I may say in answer and as a reminder, that it is not possible to inoculate monkeys with the inclusions found in swine pest and with other forms of conjunctivitis, but we can inoculate them with trachoma bodies and the cell inclusions of the so-called inclusion blennorrhea.

Sixth, the fact that we find microorganisms associated with the cell inclusions in inclusion blennorrhea simply means that we have a mixed infection and an acute process superimposed upon the underlying disturbance, trachoma.

Seventh, it may be said in passing that the element of uncertainty which has been displayed relative to the acceptance of the trachoma bodies as the etiologic factor in trachoma and in the so-called inclusion blennorrhea has been due in part, at least, to the failure to recognize the possibility of a mixed infection being associated with the trachoma bodies.

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XIII.

ROUTINE REFRACTION PROBLEMS.*

HIRAM WOODS, M. D.,

BALTIMORE.

The routine refraction problems to which I ask attention are:

1. Uncertainty regarding completeness of cycloplegia and its meaning.
2. Therapeutic uses of cycloplegics, other than that for uncovering latent error.
3. Interpretation of muscular imbalance, with special reference to the bearing on correction of ametropia, treatment of certain forms of heterophoria at the reading distance, nature's ability to counteract imbalance and prism exercise.

First, a word regarding the necessity of a cycloplegic examination. It gives, or is intended to give, and should give static refraction—exact refractive power of the eye without accommodation. That the eyes are never used without accommodation is no argument against the necessity of our knowing how much excessive ciliary activity enters into distant vision, or how much is suppressed in near vision. The knowledge of these activities is an essential part of successful refraction work. Nothing gives this save complete cycloplegia.

Most of us like to use homatropin. Probably we begin with it unless evident presence of a high error or a visible squint contraindicates it. One other condition always decides me against homatropin—apparent need of concave glasses in young persons, twenty-five years old or younger. As to the amount of homatropin needed, I am inclined to think that five or six applications of a 2 per cent solution, especially if preceded by the cocain and homatropin discs containing one-fiftieth grain of each, will give all the results obtainable by more prolonged use. There are exceptions, but I have rarely found any change after this amount of use.

*Read before the American Academy of Ophthalmology and Otolaryngology, October, 1914.

Is there any way of determining whether or not we have secured cycloplegia? I have had a few such experiences as the following:

Case 1.—A young girl showed under homatropin a $\frac{1}{2}$ D. of + astigmatism with 1 of hyperopia. Atropin doubled the hyperopia, and its use for three days did not alter this amount, which was accepted as the total error. Yet this child came back after six months' wear of + 1.50 with a manifest hyperopia of 3.50 D. One and a half D. hyperopia had remained latent in spite of prolonged use of atropin, but had gradually become manifest.

Case 2.—A girl of twenty years, with myopic refraction, showed 4 D. myopia after a week's use of atropin. The error was confirmed by shadow test. Full correction was ordered with normal vision, orthophoria at 6 meters, exophoria of 3 degrees at 33 cm. One month later myopia with accommodation was only 3 D. and she had an internal squint behind her glasses. Correction of the cycloplegic myopia had produced 1 D. of hyperopia, and defective relative accommodation had produced squint.

I do not know how to avoid such errors, which, fortunately, are not frequent. Really, we have no absolute guarantee that the ciliary muscle is completely paralyzed. When dealing with other than myopic refraction, retention of the best distant vision through a concave glass of $\frac{1}{2}$ or $\frac{3}{4}$ diopter throws doubt on completeness. But, after all, the best available tests are consistency of subjective findings with objective measurements, and permanency. By permanency I mean no variation in the axis of the astigmatism and no changes from moment to moment in the spherical or cylindrical error. An axis may vary within 10 or 15 degrees; an error may appear spherical, only after a moment to seem astigmatic. The inference is either asymmetrical refraction, of which the dilated pupil is the only evidence, or incomplete paralysis. Usually the sequel shows that the latter inference is justified at the outset. But why should the ciliary muscle be so rebellious? What keeps up the irritation? You all recognize the class of patients and know how bothersome they are.

Some years ago I adopted the following as a routine primary examination with every refraction patient: history, ophthalmometric measurements, ophthalmoscopic examination,

shadow test with undilated pupil, manifest error, muscular balance for distance and near, and accommodative range for what we used to call diamond print, but which is now marked "0.5 D." Young persons, twenty-five years old or under, should have a range from 10 or 15 to 50 cm. In a certain number I found a shortening of the far point and a recession of the near. Then two other things appeared. These were the very patients who showed resistance to cycloplegics, and after I had, or thought I had, corrected the ametropia, the accommodative anomaly relapsed. Usually there was an increase in refraction for distance, but always this peculiar form of ciliary spasm. Renewed cycloplegic tests confirmed former findings. Evidently something was at work on accommodation. What was it? One of the early cases (my own daughter at the age of eleven) showed after a few months of this variation a spot of choroidal exudate too close to the fovea for comfort; but it cleared up. Later she developed what the surgeons called chronic appendicitis, underwent operation, and since then—ten years—has been comfortable with her spherical correction. The query arose, what is behind chronic appendicitis in the way of metabolism? What are the remote effects of chronic adhesive appendicitis? I believe there is a good deal here our surgical friends might look into with advantage. Since then I have seen numerous cases presenting the accommodative condition described, with stubborn resistance to cycloplegics, and systemic examinations have shown excessive indicanuria and other evidences of intestinal disorders. I have mentioned in another paper the case of a girl who had this relapsing ciliary spasm for two years and then developed interstitial keratitis. My own observations during these years had been too narrow. I do not care to lengthen this paper with cases, but I am convinced that many systemic causes of uveal inflammation and other irritants whose action we cannot explain may produce uveal irritation before something happens big enough to call attention to the underlying cause; that a not uncommon manifestation of the irritation is some ciliary anomaly; that the presence of either of the two already discussed—resistance to cycloplegics and recurrent ciliary spasm—calls for systemic study.

The use of cycloplegics in restoring normal eye function, apart from uncovering static error, was first brought home to

me by my friend Dr. Risley, to whom all of us owe so much for making us think. The classes of cases to which he called my attention were our failure to relieve symptoms in spite of work the correctness of which we were sure, and the significance of blurring of the neuroretinal margin in uncorrected ametropia. In the first class symptoms continue. We use a cycloplegic a second or third time to verify our first results. No reason to alter glasses is found. Or another to whom the patient goes does the same, and later we learn results. Relief is finally obtained, usually without change in the original glasses. The curative agent has been the repeated rests afforded by ciliary paralysis and lessening of hyperemia. The results of eye strain were too pronounced to disappear at once. In the second class the neuroretinal blur is the result of uveal hyperemia. It shows itself at this particular place because here only the uveal and retinal circulations meet. I think the nerve head is nearly always of a reddish hue, deeper than normal. While this lasts, the eyes are irritable. Cycloplegia is sometimes needed for weeks before normal appearances are observed, and rarely does comfort come before they are restored. I have observed two other classes of patients who are greatly helped by occasional abeyance of accommodation. One has been already discussed—those who show repeated ciliary spasm in spite of refraction correction. The underlying cause may not be discoverable, or, as in diabetes, for instance, is incurable. Eye irritation continues. Such patients are greatly aided by occasional cycloplegia. They soon learn by increasing discomfort when they need it. My habit is to let them use homatropin Saturday night. Then they are ready for work Monday morning. I have patients who go through this process about once in six weeks. The other class is made up of those whose environment compels them to push the eyes whether or not they are able to work. Bookkeepers, teachers, and stenographers are types. Eyes, like other parts of the body, have working limitations. If circumstances drive the owner beyond these limits, he or she suffers. Homatropin gives the eyes a temporary rest and a fresh start.

To a greater or less degree every clinician is a law unto himself in the study of heterophoria. Tests with the phorometer, Maddox rod and kindred appliances are thought to give the tendency of divergence when eyes accustomed to binocular

vision cannot obtain it. Such tests do not of themselves tell whether the imbalance is primary, i. e., due to excessive or defective strength in one muscle, or secondary, i. e., the result of abnormal innervation, usually due to ametropia. They indicate in only an incomplete degree the need of the muscle itself for any treatment other than correction of ametropia. Decision on this point must be withheld until other tests are used, and often until time reveals. In a general way, the balance test indicates certain things as advisable in refraction correction, and experience shows these to be reliable. We aim to force latent hyperopia into manifest, as nearly as possible to total correction when the balance is esophoric; we anticipate modifying this to a greater or less degree when the balance is exophoric. We give a total correction to myopia, provided the fundus is good and acuity normal, and aim the more strenuously to this end if the balance is exophoric. We anticipate trouble if it is the other way.

With these general principles, it will probably be best if I try to set forth how I study heterophoria in routine work—not because I am sure my method is the best, but because it has seemed to stand me in good stead, and in so far as it is wrong, I should like it corrected. With the patient wearing from the trial case glasses which correct the total error as nearly as is consistent with the best visual acuity, provided this is not excessively low from intraocular lesions or amblyopia, muscular balance is taken at 6 meters and at 33 cm. I regard the normal balance at these distances as orthophoria and exophoria of two to five degrees. If some form of imbalance be present, there should still be this relation of a low near exophoria as compared with the distance balance. For instance, an esophoria of four degrees would demand, in the near, orthophoria or one or two degrees of esophoria. I use the term "normal" because this relative balance between distant and near vision is that which obtains in comfortable eyes. But balance tests are not the only means of examination. We have the various "ductions," vertical and horizontal. What is their value? It seems to me that this can be best estimated if we bear in mind the relations existing between the muscles themselves when called into action. When we test for what we call adduction at 6 meters, what are we looking for? The normal combined action of the interni is in connection with

accommodation. Visual clearness is the guiding sensation in all visual acts. Hence, effort to maintain single vision at 6 meters, through prisms, bases out, will be resigned when vision becomes blurred through innervation to the ciliary muscle, produced by increasing efforts to innervate the interni. When the patient learns how to separate accommodation from convergence, as he soon does by one or another of the various forms of prism exercise (Gould's, Duane's, or Savage's rhythmical exercise), adduction is doubled, tripled or quadrupled in a short time, sometimes in a few minutes. Is this a test of intrinsic muscular power of the interni? Have we really increased real muscular power to such an extent in a few minutes? I do not think either supposition is true. We have simply trained the interni to act independently of the ciliary muscle—developed what Donders called positive relative convergence. That defective relative convergence can be a real cause of asthenopia, there is no doubt. I shall speak of this in a moment; but its cure is not due to actual increase of muscular force. There seems to be a minimum of independent action of the interni, below which comfort cannot exist. This independence is what we call adduction, and its normal minimum is generally accepted as about three times the power of the externi, or abduction. Take, again, the vertical muscles. They have no absolutely independent action. The superior rectus acts with the inferior oblique, and the inferior with the superior oblique. When we say that infraduction, for instance, is one degree, do we know how much has come off the accepted normal of about three degrees by torsion or lack of it in the obliques? I doubt it. I have seen patients struggle with a two degree prism, turn the head a little and at once fuse vertical displacement. The external rectus is the only extrinsic muscle which has its own separate nerve supply, and no entangling alliance. I may be wrong, but for a long time I have relied on this separate nerve supply as the key to the real balance between the lateral muscles. Years ago the late Dr. Noyes' book gave five to eight degrees as normal abduction. Less than this suggested real externi weakness, more, abnormal strength, and consequently excessive burden on the interni.

To summarize as a basis for clinical study, it seems to me (1) we should regard the combined action of the vertical and

obliques as one action, not because it would not be desirable to separate our estimation of the work of each set, but because we do not know how to do it. The normal prism power of this combined action is about three degrees. (2) We should regard adduction as nothing more than the power of the interni to act at a fixed distance, independent of the ciliary muscles. (3) Abduction gives an index to the real muscular power of the externi.

With this as a working basis, I want to call attention, briefly, to two safeguards, as I term them, in estimating the significance of heterophoria in general, and to the meaning of certain peculiar departures from normal balance. If my own experience is reliable, any form of heterophoria, and to almost any degree, may be demonstrable by the phorometer, and yet the eyes give no trouble. Nature seems to possess almost unlimited powers to regulate innervation in the interests of comfort, despite what a balance test may show. A balance esophoria may be rendered harmless by lowered interni, or high externi innervation. I saw recently a school teacher, comfortable with a spherical correction of $+1.5$ sp., yet with a phorometer esophoria of ten degrees. In spite of this, abduction was twelve degrees. Why a balance test indicates weakness, and prism test, excessive strength, in a muscle with its own nerve supply, is a little hard to understand. A fraction of this esophoria would torture another patient.

The two tests I have found useful in distinguishing harmless from important heterophoria, and, at the same time, indicating whether or not prism help is needed and its amount, are the parallax test of Duane, and the red glass test of Savage. Working independently, Verhoeff developed a test identical with Duane's and called it the "shutter" test. The prism, base toward the weak muscle, which stops the parallax movement, or prevents diplopia by the red glass, serves as an index of prism correction. Usually it is not over one-half or one-third of phorometer imbalance, and according to its amount and associated ametropia, indicates no prism or its strength.

There are two peculiar forms of imbalance at the reading distance to which I want to make brief allusion. One has been presented from time to time by Theobald under the caption subnormal accommodation in young persons. He be-

believes that this condition, refraction errors having been corrected, is indicated by an esophoric balance at the near as compared with distance. For instance, orthophoria at 6 meters with esophoria at 33 cm. would indicate excessive innervation to the interni, in turn produced by excessive ciliary innervation. This, he argues, is needed because of intrinsic asthenia of the accommodative muscle. Convex lenses restore the normal near exophoria, and the lens doing so should be added to the distance correction for near work. Many troublesome cases can be relieved in this way, but the doctrine can be carried too far. The error, if it be one under such conditions, is often found in myopia; yet, a short time's wear of total correction develops the unused accommodation and restores the near exophoria which both he and I believe normal. The condition is also found in uncorrected astigmatism and rights itself after correction, for reasons which are entirely apparent. It will also clear up under correction of simple hyperopia. But the meaning (ciliary asthenia) to be attached to this near imbalance is, I think, indisputable. The sole question is whether the asthenia is essential or symptomatic. The accompanying refraction error or a little time will tell.

The other form of near imbalance is an excessively high near exophoria; for instance, orthophoria in the distance and twelve to fifteen degrees exophoria in the near. In my experience it is usually seen in the hypermetropia of adults. It is a very troublesome cause of asthenopia, and is not cured by wearing prisms, base in. I am under the impression that the following hypothetical explanation was given by B. Alexander Randall in a discussion at the American Ophthalmological Society. It is an overdoing of separation of accommodation from convergence. Positive relative accommodation or convergence—to preserve Donders' term—has wide limits and is capable of easy development. Uncorrected hyperopia forces excessive ciliary stimulation. This necessitates relative suppression of convergence to preserve visual lines. The individual overdoes it, i. e., suppresses convergence too much. I think the treatment indicated is prism exercise, provided correction of ametropia alone does not afford relief. Sometimes it does, usually it does not, for the spherical glass lessens stimulation and the muscular fault is increased. This form

of heterophoria is the only one I have ever cured by prism exercise. Patiently and repeatedly I have tried to develop the vertical and external recti, with no results. I have had only occasional improvement with distant exophoria associated with high abduction; this, I take it, is better treated with prisms, base in. It is in ridding one of a vicious habit, formed by the necessity of seeing, in spite of hypermetropic strain, that prism exercise gives best results.

XIV.

THE SMITH INTRACAPSULAR OPERATION: AN ANSWER TO DR. F. B. TIFFANY.

FRANK E. AUTEN, M. D.,

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In the ANNALS, July, 1914, I noticed an abstract reprint from the *Journal of Ophthalmology*, by Dr. F. B. Tiffany, in which he attempts to describe Lieut.-Col. Smith's intracapsular cataract operation as it is done by him at Amritsar. I fear Dr. Tiffany saw but very little of Col. Smith's work, or else he has changed his technic very much.

In the first place, Col. Smith does a complete iridectomy in practically all of his cataract operations, instead, as Dr. Tiffany states, only in complicated cases. Dr. Tiffany states that he stabs the iris near the ciliary border to prevent postoperative prolapse; I never saw Col. Smith do this. Tiffany states that Col. Smith not infrequently loses vitreous. In less than eight per cent of the cases that I personally operated upon at Col. Smith's clinic was there a loss of vitreous; Col. Smith's percentage was smaller than this. It has been my observation that many men doing the old operation lose vitreous—I think even as much as eight per cent of the cases—and nothing is thought of it; but a small loss of vitreous by Col. Smith's technic seems to be quite a bugaboo in the eyes of many men.

Col. Smith does keep his patients in bed for a week or ten days, and does not change dressings unless the patient manifests some indication of trouble in the eye. I can conceive of different opinions as to the length of time the eye should remain covered without observation, but Col. Smith, in an experience covering almost forty thousand cataract operations, has found this to be a safe procedure. I think that our patients in this country and in Europe would do better if the bandage were left on from six to ten days unless the patient complains of some trouble in the eye.

The trouble is that the profession too often does not give

this great worker a square deal. Simply because he does so many things differently than the adopted methods of Europe and America seems to be a sufficient reason for many men not to lose the opportunity of attacking his methods. I place a great deal of credence in what Col. Smith said to me, and found him a man of rare judgment and acumen, and a man whose every viewpoint was dictated by a desire to serve his patients best.

Dr. Tiffany says "that aside from rinsing his instruments in carbolic acid solution and flushing the eye with a weak solution of bichlorid of mercury before and after the operation, Col. Smith did not take the ordinary precaution against infection." I never saw any instruments used in the cataract operation, except the knives, that were not boiled before operation. I never saw Col. Smith flush the eye with a solution of bichlorid of mercury weaker than 1 to 2000, and this could hardly be called a weak solution—I would call that an extraordinary strong solution to be used in the eye. And further, I never saw Col. Smith use bichlorid after the operation. He uses no solution after the operation, simply closing the lids and applying a yellow oxid of mercury ointment to them before applying the bandage.

It is true that Col. Smith's operating room is oftentimes filled with people while he operates, but seldom are the friends permitted to be present unless for some good reason. As to dogs, I never saw one in the operating room, but the operating room is filled with patients awaiting their turn for operation. Unfortunately Col. Smith cannot command all the room he would like. While it is true that Col. Smith operates in a business suit, and that he smokes while operating, it is further true that his postoperative infections are of as small a percentage as that of any man operating today.

Dr. Tiffany noticed a large percentage of eccentric pupils, in nearly every case the iris being healed in the wound. It is true that the pupil lies higher in those cases operated by the intracapsular method, but as to the iris having healed in the wound, I think the percentage is no larger than that found in those cases operated by the old method.

Dr. Tiffany in his short stay at Amritsar unfortunately saw too little to be able to do this great master in ophthalmology strict justice, and as "a little knowledge has been said to be

dangerous," so oftentimes too slight an acquaintanceship with a man and his work do not do the man justice. I feel certain that Dr. Tiffany did not see Col. Smith do a sufficient number of operations to give the doctor a correct opinion of the value of the operation.

It has been our pleasure to see within the last year most of the great operators on the eye of Europe and of the world at their work; and with all due regard to the ripe experience and splendid achievements accomplished by many of these men, it cannot be gainsaid that they are children when it comes to operating on the eye, in comparison with Col. Smith.

I was pleased to see Dr. Tiffany's good impression of Col. Maynard and his splendid work at Calcutta. Col. Maynard is one of the big workers in the field of ophthalmology in the Far East, and is doing much for the millions in India. While his work in many respects is no less brilliant than Col. Smith's, yet Col. Smith operates on practically all cataracts by the intracapsular method, while Col. Maynard operates practically on only a small percentage by the intracapsular method.

This short statement is dictated by a desire on our part to put Col. Henry Smith in a better and truer light than is given by the impression one gets from Dr. Tiffany's description of his work. For twenty-three years, with a limited finance, oftentimes very indifferent assistants, with all the drawbacks of the climate, working through the terrible heat of summer, enduring the many hardships peculiar to India, this great man has done more for the suffering millions of India than any one who has gone before him. Not only in general surgery, but also his eye operations are so many more than has been given to any other individual, that I feel the world should have a true estimate of this eminent worker and his achievements. Without wishing to cast any reflections on Dr. Tiffany or his notations for any personal reasons, I repeat that Dr. Tiffany's errors are, I believe, only those of faulty observation due to too short a period spent in seeing the work of Col. Smith.*

*Since this article was written I have received a letter from Col. Smith, in which he states that Dr. Tiffany was in Amritsar only two days, during the off season, when he saw only two operations. One was a cataract in a bad tempered patient, and the other was a lowering of the pupil. On the observation of these two patients Dr. Tiffany has no right to judge this great worker and his results.

ABSTRACTS FROM ENGLISH OPHTHALMIC
LITERATURE.

BY

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A Peculiar Form of Retinal Atrophy in the Dog.

COAT, GEORGE (*Ophthalmoscope*, January, 1915). A second case of retinal degeneration in the dog, differing from human types, is reported with microscopic photographs.

The present case is summarized as follows: Blindness of seven weeks' duration in a collie, aged two years. No history of distemper or other illness. External and ophthalmoscopic appearances normal.

Microscopically, profound degeneration of the retina, affecting chiefly, and in the first place, the bipolars of the inner nuclear layer; in its more advanced degrees involving also the rods and cones and outer nuclear layer. Ganglion cell and nerve fiber layers very well preserved, even in the most atrophic areas. Little or no optic atrophy; no adhesion

between retina and choroid, and no disorganization of the inner choroidal layers. Slight irregularity of the pigment epithelium in places; and in the more atrophic areas some pigment invasion of the retina. Collections of mononuclear cells around some retinal and a few choroidal vessels. No other structural alterations in the choroid.

An abbreviated account of the case previously reported is given. In this case the dog became blind after a bad attack of distemper with high fever. The retina alone showed changes, affecting chiefly the inner reticular and inner nuclear layers, the former so atrophic that in places the ganglion cells are almost in contact with the inner nuclear layer.

In commenting on this case, a circulating poison with a specific, but not exclusive, affinity for the bipolar cells of the inner nuclear layer was assumed. It was supposed that these cells were first affected, but that where the toxic action was more intense the outer layers were also involved; the much slighter changes in the inner layers might be due to the same cause, or might be secondary to the atrophy of the bipolars. In the case previously reported the blindness followed an attack of distemper, which seemed, therefore, the most probable source of the toxin. In the present instance there is no such history; whether or not the dog ever had distemper, it was healthy from the first onset of defective vision until its death. If the condition be not an "abiotrophy," therefore, which seems unlikely, considering the occurrence of circumscribed patches in which the outer layers also were degenerate, its primary cause remains obscure. W. R. P.

"Eye" in Sport.

DOYNE, ROBERT W. (*Ophthalmoscope*, January and February, 1915). The author treats fully of the part played by the eyes in the various branches of sport. The anatomy of the eyes and the physiology are briefly stated. The article does not lend itself well to abstracting, and should be read in the original to be appreciated. W. R. P.

A Tumor of the Eye Presenting Unusual Features.

ELLIOT, LIEUT.-COL. R. H. (*Ophthalmoscope*, February, 1915). The case reported is a huge tumor projecting from the left orbital cavity, the anterior third uncovered by skin.

The uncovered portion is red, ulcerated and covered with yellow crusts. The lids are in constant movement, the skin soft and free. The growth was of nine years' duration.

Removal of the growth disclosed an enormously distended eyeball 75x119x80 millimeters, the outer coat and extrinsic muscles of which were immensely hypertrophied. The whole tumor gave the impression of a hard multilocular cyst, with contents of varying consistency, some parts being firmer than others.

The anterior portion of the contents consisted of a yellowish mass with fibrous bands running through it, and in shape suggested an enormous lens, whilst the posterior three-fifths consisted of what looked like cavernous tissue in which could be seen a large number of cavities filled with a dark jelly-like material. In the middle of this posteriorly was a firmer yellow mass, which more anteriorly passed into the cavernous-looking structure.

The sequel was unfortunate in that the temperature rose steadily to 105.6° F. on the fourth day, and the patient then died. There were no convulsions, but there was restlessness with an extremely rapid pulse.

Sections from the anterior part of the tumor showed an epithelium resembling that of skin devoid of hair follicles and sebaceous and sweat glands, loose connective tissue, with dense round-celled infiltration and a laminated connective tissue, sparsely vascularized. Deeper still the structure becomes much looser, forming a kind of fibrillary spongework, the meshes of which contain a homogeneous substance. The fibrils are branching processes of large multipolar cells strongly suggesting nerve tissue.

The central part of the tumor consisted mainly of irregularly arranged, fairly richly nucleated connective tissue, containing few blood vessels and enclosing numerous enormous spaces containing a granular coagulum.

The tumor is of a very unusual nature, probably of intra-ocular origin, but no conclusion was reached as to its nature.

The interesting features of the case are slowness of the growth, the enormous size of the tumor, and the extraordinary hypertrophy of the muscles and of the tunics of the eye.

W. R. P.

Blindness Caused by Ophthalmia Neonatorum.

TIVNEN, RICHARD J. (*Jour. Amer. Med. Assoc.*, November 14, 1914), presents various statistics of the causes of blindness, showing the important part played by this disease. He sketches briefly the principal measures of prophylaxis, which are well known but evidently not carried out with sufficient care and thoroughness. The measures advised by the New York Association for the Blind are divided into three groups. First, educational, through the preparation, publication and dissemination of printed matter, the object being to spread among the general public the knowledge that infant ophthalmia is a dangerous, infectious disease, fatal to sight unless checked at the time of birth, and easily preventable then if simple precautions are taken. Second, legislative. Third, cooperative. In furtherance of the same object, the committee seeks and invites cooperation with medical societies, health officers, ophthalmic, maternity and other hospitals, schools, associations for the blind, and all societies engaged in work for children and for social betterment. E. S. T.

Double Detachment of the Retina as a Sequence to Nephritis.

JONES, LEONARD W. (*Jour. Amer. Med. Assoc.*, January 23, 1915). Albuminuric retinitis is encountered in from 10 to 25 per cent of all cases of contracted kidney, but is not seen so frequently in the parenchymatous form of nephritis, nor has it in the latter condition such an evil prognostic significance. Detachment of the retina as a result of serous effusion following a lesion of the kidney is an exceedingly rare affection. The case presented was seen after a diagnosis of nephritis of five years' standing had been made. There was a well marked area of detachment below the disc in each eye. At the macular region the usual star shaped area of exudation was seen. The patient died a month later. E. S. T.

A Clinical Contribution to the Pathology of Glaucoma.

ORR, W. F. (*Ophth. Review*, February, 1914), exhibits a tendency to depart from the long accepted view of von Graefe, that increased intraocular pressure is the essential factor from which all the other symptoms can be deduced.

As the estimation of intraocular tension is usually made by means of the Schiötz tonometer, he first endeavored to prove or disprove its reliability. He found that the zero reading on the instrument varied with the curvature of the surface to which the footplate is applied.

By comparison of the readings upon the test block supplied with the instrument with those obtained from (a) special steel balls of various accurately determined diameters, (b) artificial eyes measured with the ophthalmometer and the readings verified upon the steel balls, (c) human living eyes, it was concluded that the instrument was of practical value in clinically noting rise of tension, especially variations of tension, with accuracy, only when the corneal radius was first determined.

The author cites numerous cases to prove his contentions that:

1. Glaucoma can probably not occur without increased intraocular pressure.

2. Only a very small rise of tension may accompany glaucoma.

3. Increase of pressure may exist for only a very short time before the development of glaucoma.

4. Increased intraocular tension probably occurs quite frequently without glaucoma.

5. High intraocular pressure per se does not produce glaucoma. The changes which occur are biochemic, not biophysic. Another glaucoma symptom complex is due rather to the toxic character of the lymph addition to the vitreous than to quantity.

N. M. B.

Corneoscleral Trephining.

ELLIOT, R. H. (*Ophth. Review*, February, 1914), commenting on Dr. Hill Griffiths' article on trephining, makes observations on the size of trephine; the nature of the iridec-tomy; the position of the trephine hole; and the difficulty in placing the trephine far enough forward.

N. M. B.

A Useful Modification in Extirpation of the Lacrimal Sac.

MAYNARD, F. P. (*Ophth. Review*, February, 1914), suggests an improvement on Kuhnt's operation, as follows: After separating the sac on its inner side with the periosteum, to cut through the nasal duct as low down as possible and then with

scissors to dissect the sac upwards, removing the upper domed end of it—the most difficult part of the sac to remove—last. The operation is done under a general anesthetic. The advantage of this method is that the nasal duct end of the sac is easily found, and, once found and divided, the sac is easily cleared upwards by scissors. If any of the fundus is being left behind, it becomes known at once by the scissors opening the sac—and the part so left can easily be removed. There is no hunting under the tendoooculi for the fundus, as occurs when an attempt is made, quite unnecessarily, to preserve that structure.

N. M. B.

A Case of Large Cyst in the Lower Lid.

BRIDE, T. M. (*Ophth. Review*, April, 1914). The cyst appeared to be a large chalazion, the wall formed of granulation tissue, with many lymphocytes and plasma cells. No tubercle bacilli or other organisms could be found microscopically. The histologic character suggested syphilitic lesion, but there was no evidence of syphilis in the history.

If this was chalazion, the tarsal plate had been destroyed by pressure and replaced by fibrous tissue, constituting the outer portion of the cyst wall; an occurrence of extreme rarity.

N. M. B.

A Case of Dacryops.

BRIDE, T. M. (*Ophth. Review*, April, 1914). This appears to be an undoubted case of dacryops, which is a condition of sufficient rarity to warrant publication. There could be seen protruding between the left upper lid and globe, at the outer side, a cystic swelling about the size and shape of a pigeon's egg, covered with conjunctiva showing distended vessels, and being concealed in about half its length by the lid. It was fluctuant, translucent, and on eversion of the lid showed a white line horizontally along its upper surface. The cyst increased in size on crying. Fairly extensive ulceration of the cornea was present.

The cyst was dissected out en masse and without rupture under ether. A severe mucopurulent conjunctivitis ensued, and in spite of energetic treatment the ulcer perforated and an anterior staphyloma formed. The eye was enucleated a few weeks later.

N. M. B.

Notes on Two Unusual Cases of Pulsating Exophthalmos.

MAHER, W. O. (*Ophth. Review*, April, 1914). The special points of interest about these two cases are that the pulsation in each case was arrested by pressure on the carotid artery on the opposite side to the pulsating exophthalmos, and that the internal carotid arteries were tied with satisfactory results.

In the first case the enucleation of the right eye caused a clot to form in the anterior part of the right arteriovenous aneurism. The pressure from the right internal carotid artery then caused the circular sinus which connects the two cavernous sinuses to dilate, and through them the pressure from the right internal carotid was conveyed to the left cavernous sinus, producing pulsating exophthalmos of the left eye.

In the second case a clot formed in the anterior part of the left arteriovenous aneurism, resulting in a spontaneous cure of the left pulsating exophthalmos; the circular sinus became dilated and the pressure from the left internal carotid, being conveyed to the right cavernous sinus, caused right pulsating exophthalmos.

N. M. B.

The Quantitative Method of Perimetry, With Notes on Perimetric Apparatus.

TRAQUAIR, H. M. (*Ophth. Review*, March, 1914), urges the more general adoption of perimetry, and states an accurate knowledge of the quantitative finding in impaired areas in the visual field are of decided clinical value and scientific interest. That the average visual field is a mere demarcation of areas of blindness and vision. Whether the areas of blindness are completely blind and areas still possessing vision have normal vision are not regarded as questions meriting careful investigation.

The essence of the matter has been clearly expressed by Ronne, who says: "An examination of the field of vision, in which only one object is used, is in itself just as inadequate as an examination of visual acuity with a test card which has letters of only one size." Not only that, but only rarely is the size of the test object given, and its distance from the patient, data which form the foundation of the accepted method of examining direct vision. The size of the visual field

varies somewhat with the size of the test object. The relation of the visual angle to the object used depends of course on the size of the latter and the radius of the perimeter. It is easily found by the formula: object 180/distance n equals angle, which in the case of an angle of 0.5° gives an object of 2.6 millimeters in diameter used with a perimeter with 300 millimeters' radius, or nearly 2.9 millimeters if the radius is 330 millimeters. The fraction object/distance indicates very conveniently the angle in use during any one examination; thus in the case above given the angle would correspond to 2.6/300 millimeters.

Allowing a little margin, we may say that the normal field is found with 3/300; larger objects give no further extension of importance, while those smaller than 2.6/300 give fields less than normal.

It must be apparent that a decision as to whether the field of vision in any given case is normal or otherwise will, to be valid, require much more evidence than that afforded by testing the outer periphery "in the ordinary way" with a white object 10 or 15 millimeters in diameter. In practice an object of 5 millimeters in diameter is a convenient size; at 300 millimeters it subtends an angle of approximately 1° , which, as it is nearly twice what is required for peripheral perception, is large enough to insure that any defect discovered is actually present, while small enough to elicit defects of moderate intensity. Slight defects should then be excluded by repeating the examination with a 1 or 2 millimeter object. Should no defect be found by the ordinary perimeter, the examination may be continued with a visual angle reduced to under two minutes (1/2000) or even less by using Bjerrum's screen at a distance of 2 meters or more, not omitting to note the position and size of the blind spot. It is difficult to do this satisfactorily on a short perimeter.

Speaking generally, a test for white is much more reliable than one for colors, as it is so much easier to say whether an object is seen or not than to state its color. In this connection two important facts, often not clearly expressed in the textbooks, should not be forgotten: firstly, that the extent of the field for color depends upon the size of the colored object used, the primary colors will be appreciable right out to the periphery if the visual angle is large enough; and, secondly,

that the fields for complementary colors, such as a complementary red and green, or a complementary blue and yellow, are of equal size.

Unfortunately no standard of colors has been established, and it is because the green and red generally used vary in regard to size, that the field for green is usually found to be smaller than that for red. Before deciding that a field is really normal it is, therefore, well to examine it with tests such as 5/300 red or 10, 5, or even down to 2/2000ths red, green, or blue.

When this exhaustive examination has been completed, and only then, is the examiner justified in pronouncing a considered verdict.

Should defects be found, their character should be analyzed by using visual angles ranging above and below the angle which originally elicited the defect. And any apparently blind part of the field may finally be investigated with an electric light to determine whether the loss is really absolute.

The use of colored test objects has a special value in affording an indication as to whether the pathologic process affecting the nerve fibers is active or comparatively stationary. Ronne, in a paper of great interest, has specially studied this point, and has shown that when the boundaries for color are much more contracted than those for white, that is to say, when there is a manifest disproportion between the two sets of fields, the process is relatively active; and when this feature is absent, the process is relatively stationary. The old view that a scotoma for color may exist without any failure for white was no doubt based largely on the failure to use a white test subtending a sufficiently small visual angle. When this is done it will be found that few indeed of the defects found for color are not demonstrable with white. Caution is urged in the terminology used. The word "normal" should not be employed unless slight defects have been excluded.

Wilbrand states: "An absolute defect is spoken of only where the affected regions are absolutely blind to the most powerful light that can be employed." A view which is widely accepted. And yet the term "absolute" is sometimes used to designate defects found by the ordinary perimeter which are regarded as "relative" because they are demonstrable only by objects under a certain size. But what reason is there to

assume that, when a defect is found with, say, a 10 millimeter object at 300 millimeters, vision will not be excited over the same area by a larger object or by a bright light?

It is evident that all defects are relative excepting those that fall within Wilbrand's definition, and a statement of the visual angle employed is the rational way to avoid inaccuracy.

Suggestions are made as to terminology describing the location of scotomata.

Instruments: Most perimeters at present on the market are either too complicated, too costly, or both. Undoubtedly the best form is the simple arc without any automatic registering apparatus.

N. M. B.

The Theory of Vision.

EDRIDGE-GREEN, F. W. (*Ophth. Review*, September, 1914). Unfortunately, scientific method with so many so-called scientific men is so primitive that it is almost impossible to establish even the simplest facts under one or two generations, when these facts are opposed to the statements of authority. It has taken twenty-five years to establish that the wool test for color blindness is ineffective, though it will be seen from the last report of the Board of Trade that over fifty-two per cent of those who were rejected by the lantern test were passed by the wool test, even in the specially improved form, and not a single one of those rejected by the wool test and passed by the lantern test was found to be color blind.

The theory of vision which the author has given is that the cones are the terminal perceptive visual organs. The rods are not perceptive elements, but are concerned with the formation and distribution of the visual purple. Vision takes place by stimulation of the cones through the photochemic decomposition of the liquid surrounding them, which is sensitized by the visual purple. The theory differs from others in that the rods are not regarded as percipient elements. From an anatomic point of view this seems impossible. In the reproductions of recent microscopic specimens the rods terminate in rounded knobs, many of which are connected with one neuron. Transverse neurons connect many groups of rods, and this transverse neuron is only indirectly linked with the ganglion cell connected with the fiber of the optic nerve. In order that any percipient element may be able to act as such, the anatomic paths must be different. The anatomic

arrangement, however, is perfect from the point of view that the rods regulate the distribution of the visual purple into the liquid surrounding the cones.

There are three objections made to the author's view that the visual purple is the visual substance:

1. The chief objection is that it is not present in the cones. The author maintains this is a necessary requisite to the theory.

2. That animals such as frogs, naturally possessing the pigment, continue to see after their visual purple has been absolutely bleached by prolonged exposure to strong light. The author contends that the retinas which were bleached by sunlight, and with which the frogs were still able to see, contain sufficient visual purple or its decomposition products for vision, but not enough for external recognition.

3. That the visual purple is entirely wanting in some animals which see very well. This is based upon erroneous observations, and in case of certain animals supposed to have no visual purple or no rods, subsequent observers have found both; for instance, the butterfly, bat and tortoise. Even if there were no visual purple, the argument fails, because there might be some other means of stimulating the cones.

It would seem likely that the photochemic processes necessary for vision must have an elaborate nervous mechanism which could only arise from the retina. The peculiar arrangement of the rods seems to indicate that these are the elements involved.

The anatomic arrangement is perfect from the point of view of the theory advanced. Only cones are to be found in the fovea, and they are much longer and thinner than in other parts of the retina. This applies particularly to the outer segments, which thus present a larger surface for photochemic stimulation. As the line of the pigment cells remains level and the cones are much longer, the external limiting membrane dips in and thus forms an external fovea. This was found to be .3 millimeter in size in the specimen examined.

The intervals between the rods and cones and the hexagonal pigment cells are only partially filled in by the processes of the latter; the remainder is filled by a liquid into which the visual purple diffuses. There is in the embryo a distinct space between the hexagonal pigment cells and the remainder of the

retina. This is filled with fluid and is the remains of the cavity of the primary optic vesicle.

Four depressions or canals are found which lead into the larger depression of the external fovea. These canals appear to have smaller branches and serve to conduct the visual purple into the part of the most acute vision. In certain conditions where there is obstruction of the outflow at the back of the eye these canals form a star figure. The same star figure can be seen entoptically.

The space between the rods and the cones is in direct communication with the lymphatics of the optic nerve, and this is probably how the waste products escape. Schwalbe has shown that this space may be filled by injecting colored fluid under the sheath which the optic nerve derives from the pia mater.

Then follows a number of facts which are a necessary consequence of the theory and are untenable on any other hypothesis:

1. Visual acuity corresponds roughly to the distribution of the cones.

2. Only gradual quantitative differences in sight are found between the foveal and parafoveal regions. As there are no rods in the fovea, if the rods and cones were percipient elements of a different character, there ought to be a qualitative difference between these regions.

The Purkinje phenomenon, the alteration of optical white equations by the state of dark adaptation, the colorless interval for spectral lights of increasing intensity, the different phases of the after-image, all exist, not only in the parafoveal, but also, only gradually diminished, in the foveal region.

3. Chemical analogy: The visual purple gives a curve which is similar to that of many other photochemic substances. With such substances a different curve is obtained with weak light from that observed with light of greater intensity, and it is reasonable to suppose that the visual purple which is formed by the pigment cells under the influence of a bright light would be somewhat different in character from that which is formed in darkness.

4. It is a misstatement that the periphery of the retina is color blind. It is entirely a matter of the intensity of the light employed. Bright spectral colors can be seen at the ex-

treme periphery of vision. All lights, when sufficiently small and feeble, appear white, even at the fovea.

5. The varying sensibility of the fovea is explained on the theory that when there is visual purple in the fovea this is the most sensitive portion of the retina; when there is none there, it is blind. It also shows conclusively that the fovea is sensitized from the periphery.

6. Disappearance of lights falling upon the fovea shows that when the visual purple in this area is used up and not renewed, the latter is blind.

7. Currents seen in the field of vision are not due to the circulation, but are formed by the flow of sensitized liquid.

8. The movement of positive after-images by a jerk of the head shows that the photochemic stimulus is external to the cones and can be moved.

9. Dark and light adaptation: We have an easy explanation of dark adaptation by assuming that the liquid around the cones becomes more sensitive through a greater percentage of visual purple being poured into it. In light adaptation the anatomic arrangement is such as to prevent as far as possible the decomposition of the visual purple.

The writer has discussed the theory with the chief workers of the world on vision, and they have not been able to point out any fact which is inconsistent with the theory. Should any reader be able to do so, the author would be glad to hear from him.

N. M. B.

The Choice of a Cataract Operation.

MADDON, E. E. (*Ophth. Review*, October, 1914.) Two questions are submitted: (1) Whether it is better for each surgeon to keep to one mode of operating, so as to acquire the greatest facility in its performance, or to so vary the character of operations as to suit the needs of the individual patients? (2) In the latter case, what are the indications which should guide us in selecting the appropriate operation for each patient?

The first question is answered by the fact that probably the majority of surgeons recognize that the needs of patients differ, and accordingly modify the operative procedure as it seems to them to best suit the patient's needs.

The second question is considered under five headings: Safety, visual results, beauty of the eye, brevity of procedure, fewness of operative interferences, which the author has charted as follows:

Safety.—Subconjunctival P. I. Then Desmarres, with lavage and sutures. (Czermak? or Dimmer?)

Visual Results.—Simple extraction, if ripe and ideal, or P. I., and then Desmarres if ripe, or conjunctival flap if not, both with lavage if needed. Simple extraction with lavage (if feasible). Otherwise minimal P. I., then Casey Wood, shoulder and lavage. Or intracapsular.

Beauty of the Eye.—Simple extraction, if ripe and ideal. Otherwise, minimal P. I. and lavage after conjunctival flap or bridge. Simple extraction, if suitable, with conjunctival flap or bridge. Otherwise, minimal P. I.; then conjunctival flap or bridge with lavage. Simple extraction, if ripe and fit, with lavage. If immature, minimal P. I.; then flap or bridge and lavage.

Brevity of Procedure.—P. I. not too small. Limbal incision (after a Homer Smith?). Small P. I.; then limbal incision (Homer Smith or open capsule with Graefe). As above, but smaller P. I. As above, but large P. I.

Fewness of Operative Interferences.—Combined extraction with flap or bridge, and lavage. Simple extraction, if ideal, with Casey Wood shoulder and lavage, or as above, or intracapsular. Simple extraction. Combined extraction with limbal incision, opening capsule by knife and without lavage. Intracapsular, or simple, if ideal, or combined extraction with limbal incision and lavage.

The advantages and disadvantages of each operative procedure are discussed in a thorough and impartial manner, and must be read in the original.

The author closes with the following brief summary of the procedures he advocates:

1. Give to cases ideal for it the benefit of simple extraction.
2. In all other cases prefer a preliminary iridectomy.
3. Failing both 1 and 2, perform combined extraction.
4. Reserve intracapsulars for immataure cataracts when ideal facilities present themselves.

N. M. B.

The Hygiene of Reading and Near Vision.

PARSONS, HERBERT (*Ophth. Review*, November, 1914). In this discussion the author has purposely avoided those points which have long occupied such a prominent place in ophthalmology, i. e., asthenopia due to errors of refraction, and muscular imbalance and the effect of mere work in the production of myopia. Other points of the subject have received the scantiest attention from ophthalmologists, though they are astonishingly interesting and not less important than the well-worn topics, i. e., the physics and physiology of the various types of near work—reading, writing, sewing, and the details of innumerable handicrafts. These occupations have gradually evolved as civilization progressed, and have attained a complexity which demands highly developed faculties and a minute correlation of physiologic functions to environmental conditions. This correlation has progressed empirically with the ever increasing demands, but it is only recently that the attempt has been made to analyze the conditions scientifically and replace empiricism by sound logic.

It is only within the last thirty years that the science of reading can be said to have been studied at all. It is true that much work had been done before that time on visual acuity, in which printed letters were often the test objects. They were found, however, to introduce physiologic elements which vitiated the accuracy of the results; and though the basis of reading is doubtless visual acuity in the ordinary sense of that term, the science of reading is a complex subject which involves the most difficult problems of physics, physiology, and psychology.

If we consider ordinary Roman printed characters, we find that all capital letters extend above the line. Of the small letters, thirteen are short, eight extend above the line (ascending letters) and four below the line (descending letters). There are thus twice as many ascending as descending letters, and in an ordinary page of print it will be found that of the long letters about eighty-five per cent are ascending and only fifteen per cent descending. Examination of the short letters shows that their most characteristic features are in the upper parts. Hence in reading, attention is specially directed to the upper parts of the letters, as is strikingly demonstrated by covering the lower part of a line of print with a card.

The print is almost as legible as if it were uncovered. If, however, the upper halves of the letters are covered, it is almost if not quite impossible to read the print.

The ends of the lines of which letters are composed are commonly emphasized by means of serifs. These were doubtless introduced empirically, but the advantage in sharpness of definition has a physiologic basis. They counteract irradiation, and hence the visibility of letters is improved if the serifs are triangular.

Legibility is not determined solely by visibility in the physiologic sense of the term. A child, learning to read, depends upon physiologic visibility; hence there should be little difference between the breadth of the thick and slender strokes. As facility in reading is acquired, legibility is increased by diminishing the breadth of the slender strokes.

The spacing of the letters and words has a considerable effect upon legibility. Irradiation plays an important part here. Roughly speaking, the interspace between letters should be at least as broad as the blanks in *m* or *n*, but round letters like *o* and *e* should have slightly less interspace than square letters. Owing to irradiation, the interspaces in general look larger than they really are, and two *o*'s separated by a space look farther apart than two *n*'s separated by the same space. Javal attributes a large part of the "remarkable legibility of English books" to the shortness of most English words and the consequent multiplication of blank interspaces. There is some difference of opinion as to whether "leading" or interlinear spacing is beneficial. Owing to the design of the blocks of type there is always a small space between the lower limits of descending and the upper limits of ascending letters, even without leading.

A line of print is read in a series of small jumps. At each pause a group of about ten letters is more or less accurately visualized. Attention is directed chiefly to the commencements of words, and words are not read by letters, but by their general configuration. There is, therefore, a very important psychologic factor involved in the act of reading, quite apart from the interpretation of the meaning of words.

A letter measuring 0.7 millimeter in height subtends an angle of five minutes at the nodal point of the eye when it is about 30 centimeters or one foot away. It should, therefore,

be clearly visible at that distance, and the amount of convergence required will be only eleven degrees. It will be found, however, that prolonged reading of print of this size is extremely trying to the eyes.

Weber found that the rapidity of reading letters diminished if they were more than 2 millimeters in height, that the best mean height was 1.5 millimeter. Griffin and Franz found that print 1.8 millimeter in height can be read quicker than when it is only half that height. The intensity of light necessary for reading increases rapidly in passing from 1.5 millimeter type to smaller sizes.

As to the thickness of the strokes of a letter, Cohn advocates that they be one-quarter millimeter broad in type 1.5 millimeter high, while Fick and Stettler found that the Snellen standard of a thickness equal to one-fifth the height gave the best visibility. Greater thickness affords no improvement, and diminution reduces visibility. Weber advocates a 2 millimeter interspace for 1.5 millimeter type, but Cohn requires 3 millimeters. Fick roughly points out that the interlining should be broadened when the lines are long, so that in passing from line to line less difficulty will be experienced. He recommends the proportion 40:1 between the length of line and the breadth of interlineation.

As regards the distance between letters and words, Weber found that an average of sixty letters in 100 millimeters gave the best results. Too great dispersion of the letters diminishes legibility, forty letters in 100 millimeters being, according to Weber, the minimum allowable. At least 0.5 millimeter should be allowed between each letter. Cohn permits 1 millimeter between the letters, 3 millimeters between the words, and forty-four to forty-six letters in a line 94 millimeters long; with letters 1.5 millimeter high. This arrangement gives a very pleasing and legible print.

The tendency in modern books has been to reduce the length of the lines, partly perhaps owing to the loss of favor for quarto volumes. Cohn gives 90 millimeters as the ideal length, 100 millimeters as the maximum, and 30 millimeters as the minimum. Longer lines than the maximum throw an undue strain upon the accommodation, render it difficult to pick up each succeeding line, and involve greater range of movement and expenditure of muscular energy. Shorter

lines interfere with the proper grouping of the words as the eyes pass from one group to the next, and increase the number of long jumps from line to line. At the same time it must be observed that the golden mean advocated applies only to type of fair size, such as that of 1.5 millimeter in height, and that no absolute rules can yet be devised for the best proportions to be adopted under the very various conditions which can be contemplated. In good print the number of letters in any portion of the page should not exceed fifteen to the square centimeter to be considered suitable in size and interlineation from the hygienic point of view.

Roughly speaking, various observers have shown that the minimum illumination of the types which permits of normal visual acuity with Snellen's test is two to three meter candles.

A glaring light in the field of vision has less effect in diminishing visual acuity at ordinary illuminations than might be thought, but there is no doubt that it is distressing and should be avoided.

It is suggested that (a) for ordinary clerical work (reading and writing, etc.), the minimum illumination measured at any desk where the light is required should not fall below 2 foot candles. (b) For special work (art classes, drawing offices, workshops, and stitching with dark materials, etc.), a minimum of 4 foot candles is desirable. (c) For assembly rooms, etc., and for general illumination, a minimum of 1 foot candle measured on a horizontal plane 3 feet 3 inches from the ground.

N. M. B.

On the Choice of an Operation for Cataract.

McKECHNIE, W. E. (*Ophth. Review*, November, 1914), summarizes and concludes his article as follows:

1. The ideal operation is the complete removal of the lens, leaving the other parts normal.
2. This ideal cannot yet be attained with certainty.
3. A safe procedure, giving good results, is preliminary iridectomy, large incision, and capsulotomy by forceps or knife. Secondary operations may be needed.
4. A procedure nearer the ideal is Smith's intracapsular operation. It is safest with iridectomy, but can be done without it. It is the present operation of choice in Northern India, where it has given very good results.

5. It requires more skill than the other, as inaccuracy of technic is less permissible, and it requires a larger incision.

6. The zonule of Zinn is not "tough."

7. The chief difficulty with the Smith intracapsular operation is not escape of vitreous, but the toilette of the wound after delivery of the lens.

8. The easiest cases to do the intracapsular operation on are immature cataracts in orbits with little fat, with loose lids and sunken eyes, and where the lens is not very big. (Bigness being indicated by a shallow anterior chamber.) Such cases are often very easy. N. M. B.

The Refraction of the Eyes and Nystagmus in Two Albino Infants.

USHER, C. H. (*Ophth. Review*, December, 1914), brings up the question as to whether the astigmatism of the albino eye is congenital or acquired, and due to the development of nystagmus in albinos. Gould attributed the astigmatism in the eyes of albinos to the influence upon the eyeball of persistent lid pressure and blepharospasm, aided by contraction of the external muscles of the eye and muscles of the face.

Case 1.—Examined by skiascopy when twenty-six days old under atropin. Result: Right eye, H. 5 D. in vertical meridian and 9 D. in horizontal. Left eye, H. 3 D. vertical meridian and 8 D. horizontal. Slow lateral nystagmus. Has three brothers albinos whose histories were published in "Albinism in Man."

Case 2.—Examined by skiascopy, under atropin, when two days old. Result: Right eye, H. 6 D. vertical, 12 D. horizontal. Left eye, H. 8 D. vertical, 12 D. horizontal. About one year and nine months later a second examination under atropin was made. Result: Right eye, H. 6 D. and 8 D. Left eye, H. 7 D. and 10 D.

It seems quite evident that in both of these cases a marked degree of astigmatism was present in each eye at birth. There is no evidence from the second examination of the second case that astigmatism had increased, as would have been expected had continued lid pressure acted in the manner suggested. The astigmatism in these two cases should, therefore, we think, be regarded as congenital.

Nystagmus was not present in the second case at the age of two days though constant lateral nystagmus developed later on. Also in the first case at the age of twenty-six days the nystagmus was slow. These facts are in conformity with the suggestion that has already been made from scanty data, that the rapidity of the oscillations of nystagmus in albinos tends to increase, up to a certain time, with age.

N. M. B.

Technic in Cataract Operations.

STORY, J. B. (*Ophth. Review*, December, 1914). This paper is made up of comments upon the classified replies of one hundred and twenty-six ophthalmic surgeons to a list of questions sent by the author. The answers evidently are as variable as the number of individuals replying. The paper must be read to be appreciated.

N. M. B.

Trypanosomiasis as a Cause of Iridocyclitis.

JELLETT, J. W. H. (*Ophth. Review*, February, 1915), reports this case for the reason that the connection between trypanosomiasis and iridocyclitis does not appear to have received full recognition from ophthalmologists, although the causal relationship between the two is believed well known to experts in tropical medicine.

After a sojourn in Northern Nigeria the patient returned suffering from recurrent attacks of "fever" and a tapeworm. The attacks of fever remained after being rid of the tapeworm. Shortly after return to Nigeria, ocular symptoms began to develop and were recurrent. Prolonged search discovered trypanosomes in blood, and the patient was sent to a school of tropical medicine for atoxyl treatment.

All other possible sources of toxin poisoning, including syphilis, were carefully eliminated. With the exception of one carious tooth, which was immediately extracted, the buccal cavity was in good condition, as was the remainder of the alimentary tract. The accessory sinuses showed no signs of disease, either clinically or on transillumination, while the heart, lungs, and other internal organs were perfectly healthy. It is, therefore, difficult to come to any conclusion than that the iridocyclitis was due to the trypanosome infection.

N. M. B.

Limbal Puncture.

SMITH, D. P. (*Ophth. Review*, February, 1915). The idea of puncturing the eye deeply at the margin of the cornea for the relief of tension is not new. It was done many years ago by Solomon, Handcock, Pritchard, and others, but never, I believe, in the way described by the author.

It consists of a radial slit through the limbus, angle of anterior chamber and periphery of iris, into the vitreous. Three instruments are needed: Speculum, fixation forceps and Graefe knife.

A point of interest is that although the anterior chamber is open, its depth is seldom noticeably altered, for the knife taps the vitreous also, and, the two chambers being therefore in communication, the escape of fluid lowers the pressure in both equally, and the anterior chamber is not emptied by superior pressure from behind, as happens when it alone is tapped. Several operations are described. N. M. B.

Oculomotor Paralysis of Otitic Origin.

WESTMACOTT, F. H. (*Lancet*, November 14, 1914). This very interesting and scientific paper is not easily abstracted, as the author goes into such concise anatomic details. He states: "Interference with function of the third cranial nerve may occur in one of three parts, according to the symptoms produced. Firstly, in the nuclei of origin in the gray column in front of the aqueductus cerebri and the corpora quadrigemina, together with the supranuclear portion. Secondly, in that portion which extends from the point of exit of the united bundle of fibers on the medial side of the cerebral peduncle, just in front of the pons, passing forward between the posterior cerebral and superior cerebellar arteries to pierce the dura mater beside the posterior clinoid process, in the small triangular space between the free and attached borders of the tentorium cerebelli. Beneath the dura mater the nerve courses through the lateral wall of the cavernous sinus until it enters the orbit through the superior orbital fissure. Thirdly, from its entrance into the supraorbital fissure and orbit, where it divides, to the terminations of its distribution. It is considered, however, that all lesions below the nuclei are peripheral, all above are cerebral." A case is described in detail which was caused primarily by a cholesteatoma which

had eroded through the tegmen antri and set up a subdural abscess. The infection worked along the superior petrosal sinus, and so to the trunk of the oculomotor nerve. Many references to reported cases are given. N. M. B.

Spontaneous Recovery From Detachment of the Retina.

EASON, H. L. (*Lancet*, January 2, 1915), reports a case of spontaneous reattachment of retina in a highly myopic eye. With the exception of a posterior staphyloma, and the rather thin choroid of high myopia, the interior of the eye was normal in every respect. He does not know that any satisfactory explanation has been given of the fact that in cases of detachment of the retina, vision only remains in abeyance and is restored immediately the retina once more comes in contact with the choroid. The loss of vision can hardly be due to any failure of vascular or lymphatic circulation, as under these circumstances the retina would degenerate rapidly after detachment, and recovery after an interval of any length would be impossible. The retina always strips away, leaving the layer of pigment epithelium attached to the choroid, and it seems probable that without the pigment epithelium, and possibly the visual purple, the other layers of the retina cannot perceive light. N. M. B.

Report of a Traumatic Paralysis of Both External Recti.

WOODRUFF, FREDERICK W. (*The Am. Jour. of Ophthal.*, September, 1914). A boy, four and a half years old, fell through a cellarway, striking his shoulder and the side of his nose; no other marks of injury could be found. Ten days later Dr. Woodruff saw the patient, and found a paralysis of both external recti. The treatment was a slight purge and rest in bed. After about three weeks the left eye began to move a little beyond the median line, and the right eye showed improvement in about four or five weeks. Dr. Woodruff then describes the origin and course of the abducens nerve, pointing out the fact that owing to its long course, paralysis is not uncommon in intracranial lesions. E. C. E.

Ocular Tuberculosis in Relation to the Nose and Throat.

LUEDDE, W. H. (*The Am. Jour. of Ophthal.*, October, 1914). Tuberculosis of the eye is usually considered sec-

ondary. The lungs and bronchi are usually considered as the chief primary seat of tuberculosis, though in some cases of ocular tuberculosis there are conditions in the throat, nose or accessory sinuses which may explain the etiology of the ocular process. The course of infection from the nose to the eye is easy to trace. It seems more likely that the infection is carried to the eye from the nose, than through the blood stream. Dr. Luedde then reports four cases in support of his position.

Case 1.—A man, thirty-one years old, noticed vision of left eye failing about 1892. Right eye vision began failing early in 1908. He consulted Dr. Luedde about three months later. Examination showed central choroiditis in right eye, and old choroidal scars in left eye. No history of syphilis or tuberculosis. Nasal examination showed "nothing definite." Treated with bichlorid without effect. A "suspicious" condition reported in apex of right lung. Tuberculin test (injection O. T.) caused focal reaction in right sphenoidal and posterior ethmoidal sinuses and in the choroidal lesions. No local or general reactions. The patient stopped treatment for nine months, when he returned much worse. A von Pirquet test was then positive. He was then given treatment with tuberculin, and the first injection was followed by a focal reaction in the eye. After fifteen months' treatment the choroidal scars showed no active focus. The vision in left eye was very much improved.

Case 2 was one of central retinochoroiditis. The general physical examination was negative. Left nasal passage congested. Von Pirquet test negative; two injections of .002 mg. O. T. were negative, but .005 mg. O. T. gave a marked focal reaction in the nose and eye. No general reaction. The ocular condition was much improved under these injections.

Case 3 was one of parenchymatous keratitis in right eye. Examination showed good general condition; no pulmonary tuberculosis or atrophic rhinitis. An injection of .002 mg. gave no general or local reaction, but produced slight focal reaction in the eye. Tuberculin treatment together with local treatment was given for four months, with uncomplicated recovery.

Case 4.—Chronic uveitis. The Wassermann test was negative, von Pirquet positive, accompanied by focal reaction in

eye and posterior ethmoidal sinus. No general reaction. Injection of O. T. Patient is now being treated with tuberculin and is improving.

E. C. E.

Recent Advances in the Treatment of Dacryostenosis.

GREEN, LOUIS (*Jour. of Ophthal. and Oto-Laryngology*), describes his operation for the relief of dacryostenosis, which he says is a slight modification of the procedure described by Bryan and the latest procedure of West.

Under cocain and adrenalin anesthesia the mucous membrane and periosteum of a rectangular area of the external nasal wall over the situation of the lacrimal sac is elevated. The bone is then chiseled away and the internal wall of the sac is excised. Before replacing the flap, which is left attached at its lower extremity, enough of it is excised to leave a permanent opening between the sac and nose. The nose is then packed with gauze until the following day. After the pack is removed the sac is irrigated through the canaliculus daily until healing is complete.

Green says that this operation is contraindicated when an intraocular operation is contemplated. He mentions the obvious objections to the older methods of treatment of dacryostenosis, and reports two cases which had been unsuccessfully treated with probes, etc., and which were cured by his operation.

E. C. E.

Congenital Word Blindness, or Inability to Learn to Read.

CLEMESHA, JOHN C. (*Jour. of Ophthal. and Oto-Laryngology*, Vol. IX, No. 1). Word blindness may be due to a congenital defect or deficiency in the brain center, or to some pathologic process, usually occurring in later life, destructive to that center.

Hinshelwood describes word blindness as a condition in which, with normal vision, an individual is unable to interpret words or printed language.

In learning to read there are two stages. The first stage is the storing up in the visual memory center the individual letters of the alphabet. The second stage consists in the acquirement and storage of the visual memories of words. The latter is a much more formidable task than the former.

These visual memories of letters and words are registered in the angular and supramarginal gyri of the left side of the brain in right handed individuals. Many persons completely letter and word blind can read figures.

It is estimated that one in two thousand children in the London elementary schools have word blindness to a considerable degree. It occurs more often in boys than in girls, and as a general rule these children are bright, alert and good at figures.

Dr. Clemesha reports several cases of word blindness in children who were bright and good at figures. Two of these cases were in one family, and the mother stated that her mother could never read well.

E. C. E.

The Treatment of Tabetic Optic Atrophy With Intraspinal Injections of Salvarsanized Serum.

JOHNSON, GEO. T., BREAKS, L. Z., AND KNOEFEL, AUGUST F. (*Jour. A. M. A.*, September 5, 1914), report two cases of tabetic atrophy treated by salvarsanized serum.

Case 1.—Positive Wassermann; general examination negative except for absence of left knee jerk, discs grayish white; cannot distinguish colors, right field concentrically contracted, and left field shows defect involving upper nasal quadrant. Vision in O. D. equals 20/70; O. S. equals 20/200.

Patient was given several doses of neosalvarsan intravenously, and several spinal injections of salvarsanized serum, between January 23, 1914, and April 4, 1914. After the last injection there was a slight left knee jerk, the sector defect in the left field had disappeared, and the patient was beginning to distinguish color. On May 24th vision in O. D. equaled 20/50; O. S. equaled 20/100.

Case 2.—Ocular examination: Right eye, totally blind; left eye, vision 20/100, upper half of field wanting; right pupil has consensual reaction, but does not react to light; left pupil reacts to light slightly. Patient cannot distinguish colors.

General examination revealed absence of knee jerks, presence of Romberg's sign and incoordination of upper and lower extremities. From March 3, 1914, to May 4, 1914, he was given several intravenous injections of neosalvarsan and intraspinal injections of salvarsanized serum. On May 18th examination showed that coordination was noticeably improved,

knee jerks absent, vision 20/30. Patient distinguished colors, and the color fields were mapped with a 1.5 test object.
E. C. E.

Partial Tenotomies by the Todd-Harman Method.

LOWELL, W. HOLBROOK (*Boston Med. and Surg. Jour.*, January 14, 1915), has operated four times by the so-called Harman method, which was really first described by F. C. Todd six years before Harman called attention to it. The method is described and the histories of the three cases given.

In the first case some fifteen degrees of esophoria were corrected; in the second, fifteen of the same anomaly, and in the third, eleven degrees of hypertropia. The writer is well satisfied with his results.
G. S. D.

Report of One Hundred Successive Extractions of Cataract in the Capsule After Subluxation With the Capsule Forceps.

KNAPP, ARNOLD (*Archives of Ophthalmology*, January, 1915). After a study of the extraction in capsule operation, with instruction under Smith himself, Knapp has abandoned this method, and now calls attention to the possibility of subluxating the lens, using Kalt's capsule forceps.

Corneal section should be just short of half of the corneal circumference with a conjunctival flap. An iridectomy is performed. The capsule is grasped not too tightly at a point below the center of the pupil. The closed branches of the forceps are gently moved from side to side, up and down, or rotated, and the capsule can be seen to follow in the various directions. The grasp should not be too tight, lest the capsule be torn. If dislocation of the lens is successful, the margin of the cataract appears in the pupillary space. The dislocated portion is usually below, with the upper attachment unruptured. The forceps is then withdrawn and pressure is exerted straight back on the lower part of the cornea with Smith's hook, and the cataract can then be seen to "tumble." On delivery of the lens, it can be seen to be attached above and is finally separated by a lateral stroking motion. If the head presents first, delivery is slower and counter pressure must be applied at the scleral margin.

Owing to the size of the whole lens, it sometimes becomes wedged in the iris angle and is often extracted with some-

what more trouble than in the ordinary operation. If the capsule ruptures during expression of the lens, it can usually be easily grasped and drawn out with the capsule forceps, after the contents have been expelled. Both eyes are bandaged for four days following the operation, unless there is an indication for looking at the eye at an earlier period.

The operation may be followed by some deep opacity at the cornea, especially if the lens be large and the incision small. This disappears at the end of a few days.

Knapp is apparently well satisfied with this operation, and presents statistics of one hundred cases.

Dislocation with the capsule forceps succeeds only in a certain percentage of cases, perhaps forty to fifty per cent. It should not be undertaken in unruly patients. It succeeds proportionately with the age of the cataract.

In the series of one hundred, prolapse of the vitreous occurred in sixteen cases; iritis or cyclitis in nine; prolapse of iris in six; detachment of the choroid in two; seventy-six cases were uncomplicated. The final results were excellent.

Nearly a year after Knapp began with this operation, Stanculeanu reported on a method of extraction practically of the same nature using the Manolescu forceps. Stanculeanu succeeded in dislocating the lens by this method in fifty to seventy per cent of cases, and is well satisfied with his results.

G. S. D.

Purulent Meningitis Following Penetration of an Eyeball by a Fishhook.

VEASEY, CLARENCE A. (*Archives of Ophthalmology*, January, 1915.) The patient, sixty-six years old, had his eye penetrated by a fishhook near the center of the left cornea while fly fishing. The point penetrated the lens. Seven hours later he came under medical treatment, and the general practitioner advised removal of the eyeball at once.

Some thirty-six hours after the injury he was seen by the writer, who found a small, ragged wound near the center of the cornea. The iris appeared to be covered with a thin layer of pus. There was moderate edema of the conjunctiva. Immediate enucleation was declined. Treatment, with irrigation, was at once instituted. The following day, as the signs were more marked, the wound was opened and pus evacuated.

Less than three days after the injury, enucleation was consented to and performed. On opening the eyeball, a thin, grayish line was found extending from just behind the lens almost to the optic nerve. About twenty-four hours after enucleation, symptoms of meningitis set in. Two days later, lumbar puncture showed very cloudy fluid, and pure culture of pneumococcus. In spite of the injection of antipneumococcus serum, the patient died four days after enucleation. The socket remained clean following the operation.

A number of similar cases have been reported. Examination of the literature indicates that in these cases, in all probability, the meningeal infection precedes the operation and is not caused by it.

The infection may enter the brain either by passing directly backwards along the structures, entering the cranial cavity by the sphenoidal fissure and optic foramen. In this case the base of the brain is most affected. If infection takes place by way of the blood or lymph stream, the postmortem shows involvement in the sinuses and of the surface of the brain. Veasey believes that infection took place by way of the optic nerve in this case. The longer pus is shut up in the eye, the greater is the risk.

G. S. D.

Loss of Vitreous in the Intracapsular Cataract Operation and Its Prevention.

FISHER, W. A. (*Archives of Ophthalmology*, January, 1915), believes that if loss of vitreous could always be avoided, the intracapsular operation for cataract would be the best operation. It is granted that loss of vitreous occurs more frequently in intracapsular operation than by the capsulotomy method. For this there are two causes: first, an unruly patient, and in this case a sedative should be given some time before the operation. Pressure upon the eyeball by the lids can be eliminated by the writer's lid elevator, and exact directions are given for its use.

Fisher describes a new instrument by which pressure in the intracapsular operation can be greatly modified. This carried at one end a spoon and at the other a needle. The spoon end is used for delivery of the lens when vitreous has escaped. The needle is designed to move the lens when it is sticking in the gaping corneal wound and no progress is being made.

Fisher believes that with these aids loss of vitreous can be made as infrequent in this operation as in the old one.

If the capsule has been ruptured, an attempt should be made to remove it with capsule forceps.

Fisher extols the advantages of the intracapsular operation.

G. S. D.

Ophthalmoplegia Interna the Result of Lead Poisoning.

BROSE, L. D. (*Archives of Ophthalmology*, January, 1915). The patient, twenty-five years old, a painter in a large carriage factory, began to lose his sight. Examination showed vision in each eye, with correction, to be 15/20. Ophthalmoscopic examination was negative, as was also the field. A diagnosis of nuclear lead palsy was made. Iodid of potash was prescribed and also sulphate of magnesia. Rapid recovery took place.

Five months later a recurrence set in, and the same symptoms were present. Again, under the precautions prescribed, a rapid restoration of sight took place.

Paralysis of the eye muscles due to plumbism are very uncommon. Uthoff states that lead forms only a small percentage of the cases of toxic amblyopia. Oliver distinguishes two forms of neuroretinitis; the first acute, and the second chronic. With the second form the field of vision may be that of a typical retrobulbar neuritis. Other symptoms of the condition should be looked for in each case.

G. S. D.

Concerning Removal of the Eyeball—Exenteration Versus Enucleation.

GRADLE, HARRY S. (*Archives of Ophthalmology*, January, 1915), bases his discussion upon the operations of enucleation and exenteration performed during the past four years in the German University Eye Clinic in Prague. The particular operation is described. There were sixty-seven enucleations and eighty-six exenterations. In fifty-one of the first class, ganglion anesthesia was resorted to, and also in thirty-eight of the second group. Of these one hundred and fifty-three cases, sixty-two of the sixty-seven in which enucleation was performed healed smoothly in less than ten days; in five healing was prolonged for more than ten days.

Of the group in which exenteration was performed, fifty-five healed smoothly in less than ten days; in seventeen healing was prolonged; in two suppuration occurred; in twelve suppuration and scleral sloughing ensued; in fourteen a secondary paraffin injection was carried out to produce a larger stump more freely movable.

Of the sixty-seven enucleated cases, forty-two were operated on because of a noninflammatory condition. Among the eighty-six eviscerated cases, fifty-seven were operated on for acute inflammatory trouble.

The writer refers to the advantages of enucleation on account of its simplicity and the rapidity of its healing. It, however, presents several serious disadvantages. The nodule remaining in the orbit after enucleation is smaller and less freely movable than the stump following evisceration. Evisceration overcomes the esthetic or religious objections of the patient. The stump is large and freely movable, and a secondary injection of paraffin may be performed. Cosmetically, simple evisceration heals about as well as enucleation combined with the implantation of fat. Immediate sequelæ of evisceration are less pleasant than those of enucleation. The hospital stay is doubled or trebled.

A discussion of the advantages of the two operations from the standpoint of sympathetic disease is given. In evisceration there is always the danger of leaving remnants of uveal tissue. It is not justifiable to assume that enucleating an eye suffering from panophthalmitis is dangerous to the life of the patient, but it is advisable to eviscerate the eyeball in the presence of an unduly purulent panophthalmitis.

From the economic standpoint, enucleation is to be preferred; while from the cosmetic standpoint, evisceration is the operation of choice.

G. S. D.

Epibulbar Sarcoma With Microscopic and Macroscopic Sections.

CRIGLER, L. W. (*Archives of Ophthalmology*, January, 1915). The patient, a female seventy-four years of age, gave a history of a tumor of the left breast removed twenty-five years previously. January, 1914, she noticed a small black spot at the outer margin of the cornea.

The left eye showed a small black tumor mass situated between the insertion of the external rectus and the corneal

margin. The triangular area of slight pigmentation in the conjunctiva coincided with the margin of the tumor. The tumor measured 8x5 millimeters. Enucleation was performed, and the microscopic examination showed a mixed cell melanotic sarcoma.

Examination of the records of the Manhattan Eye, Ear and Throat Hospital shows only four epibulbar sarcomata out of one hundred tumors of the conjunctiva.

The tendency of these tumors is not to penetrate the globe, but to recur locally and to produce metastasis.

Statistics of Verhoeff and Loring prove beyond doubt that epibulbar sarcomata should be dealt with as radically as sarcomata in other parts of the body.

Of seventy-three published cases, it is known that recurrence took place in thirty-six and perhaps in more.

It should be briefly stated that small pigmented tumors situated wholly within the conjunctiva and freely movable, showing no tendency to show proliferation, should not be classed as sarcomata, and thus should not be dealt with so radically.

G. S. D.

New Operative Procedures for Shortening and Lengthening Muscles.

O'CONNOR, RODERIC (*Ophthalmic Record*, December, 1914), describes an advancement operation which he claims avoids the disadvantages commonly encountered, such as constriction of the tissues by the sutures or ligatures, tension on the point of union by the operated muscle and its opponent, slipping of sutures and the stretching of the operative muscle causing paresis.

The operation, briefly, consists in dissecting out a small strip at the upper and lower borders of the muscle and shortening these two strips by an ingenious arrangement of strands of catgut of different sizes. The central portion of the tendon is then attached to the sclera, and is under no tension. The procedure is undoubtedly a complicated one. The writer then goes on to discuss graduated tenotomies by various methods of incision.

For those interested, the paper should be read in the original.

G. S. D.

Concerning the Use of Invisible Bifocals in the Treatment of Convergent Strabismus (Esotropia) in Little Children.

REBER, WENDELL (*Ophthalmic Record*, December, 1914), discusses the various theories to account for esotropia, and postulates:

1. That a certain percentage of esotropes under seven years of age lose their convergent strabismus under the influence of corrected refraction, thus conforming to Donders' accommodative strabismus.

2. That a certain percentage of esotropes under seven years of age are practically emmetropic, or even myopic, and thus this class cannot be explained by Donders' hypothesis.

3. A certain percentage of young esotropes exhibit congenital paresis or palsy of one or two of the extraocular muscles.

4. A certain very small percentage of very young esotropes are subject to faults either in the development or insertions of the extraocular muscles.

5. A certain percentage of young esotropes are subjects of fine ultraophthalmoscopic changes in the retina or optic nerve of one eye.

Functional strabismus arrays itself in three classes:

(a) Pure accommodative strabismus.

(b) Pure affusional strabismus.

(c) A combination of a and b.

In order to put the entire accommodative apparatus at rest, the writer for the past three years has been in the habit of adding to the glasses ordered a bifocal segment of from + 1.0 to + 3.0 D. to be used for near work. This treatment has been successful. Of eleven cases, eight now have straight visual axes. The child soon begins to adapt himself to the presence of the bifocal segment.

G. S. D.

Operation for Squint.

WORTH, CLAUDE (*Ophthalmic Record*, December, 1914). Convergent Strabismus.—Of the cases in which efficient treatment is carried out soon after the first appearance of the deviation, only a small proportion ever need operation. But in some cases without any defect in a single muscle there is a defect in oculomotor balance, which, if the fusion sense had been perfect, would have given rise to esophoria. Many of these will need operation. If in children who come under observation at a late period the

angle of deviation is not decreasing under treatment, the question of operation should be considered.

If the refractive error be only of moderate degree in the case of older children and adults, and the eyes are straight with glasses but convergent when the glasses are removed, Worth gives the patient the option of operation. The operation is an advancement of one external rectus or both. Glasses are left off for at least three weeks before the operation.

Vertical deviation, which is sometimes seen with convergent strabismus, when only apparent, disappears when corrected. True vertical deviation should be corrected by advancement of the inferior rectus muscle.

Divergent Squint.—Myopic divergent squint rarely calls for operation, and when it does, advancement of both internal recti is usually required. In beginning secondary divergence after a tenotomy of the internal rectus, the sooner the tenotomized muscle is sought for and readvanced the better.

Experience has convinced Worth that tenotomy combined with advancement gives results which are ultimately very unsatisfactory. 'Simple advancement by his method gives results which do not change with time. Simple degrees of convergence or divergence may be corrected by advancement of one muscle. Larger defects require advancement of two.

Worth uses thin, undyed silk and small needles. He slips a tiny ring of black silk along his suture to mark it. All loose tissue over the sclerotic must be scraped away before advancing the muscle. To insure permanent results, he keeps the patient in bed with both eyes bandaged for ten days. He has no objection to using a general anesthetic.

Firm hold of the suture in the sclerotic is insisted on. His sutures traverse exactly two-thirds of the thickness of the sclerotic. Worth makes the statement that if a suture were inserted through the whole thickness of the sclerotic it would probably lead to the loss of the eye. [It is hard to see where the justification for this statement exists.—Rev.] The beginner should practice assiduously upon pigs' eyes. G. S. D.

Insufficiency of Convergence—Its Diagnosis and Treatment.

LANDOLT, EDMOND (*Ophthalmic Record*, December, 1914), reiterates once more his conclusions in regard to the impor-

tance of what he terms insufficient or weak convergence. The amplitude of convergence should be recorded in meter angles in cases of asthenopia. Two-thirds of the amount of convergence must be kept in reserve; thus, if the amplitude falls below nine meter angles, symptoms of asthenopia commonly ensue. The amplitude of convergence should be measured at the patient's usual working distance.

As a rule, prisms fail to relieve the symptoms, and while rest and attention to the general condition and other hygienic measures are always to be borne in mind, operative measures are most effective for the relief of the patient.

Tenotomy of one or both abductor tendons is unsatisfactory and does not always cure the case. This Landolt lays to an interference with the facultative or latent divergence.

Advancement of one or both interni is the operation of choice. Advancement of one internal rectus without tenotomy may increase the convergence power from three meter angles to twenty meter angles, and this excessive addition to convergence does not interfere with the important relative divergence.

When three, six, or more meter angles of additional convergent power are required, Landolt always advances the tendon of one internus to the corneal margin. Even an excessive result relieves the condition, and is almost invariably satisfactory.

In a certain class of neuropathic patients, after operation the condition may almost revert to the original one, and in these, treatment directed to the general nervous condition should be instituted in conjunction with the surgical intervention. Fortunately, such instances are rare. G. S. D.

Extraocular Tendon Lengthening and Shortening Operations Which Enable the Operator to Regulate the Effect.

TODD, FRANK C. (*Ophthalmic Record*, December, 1914), amplifies and extends the descriptions of his muscle operations. He states that his method of tenotomy does away with the dangers of overcorrection and the possibility of creating a defect in an opposite place. The advancement operation, which consists in the tucking of a tendon, enables the operator to regulate the effect desired. Complete tenotomy of an extraocular muscle should never be performed, because it is

inexact, and because reattachment of the tendon may take place either above or below the site of the former attachment. It is also impossible to determine the amount of effect which may be produced in any given case. When reattachment takes place, the control over the movements of the eye is considerably limited.

Partial tenotomy of Stevens is ineffective and has been entirely abandoned.

Todd gives sketches which illustrate possible ways of lengthening tendons by partial cutting through of the fibers. All the fibers are not severed, however.

In the case of any deviation, it is always necessary to secure an overeffect at the time of the operation. If the degree of error is so great that both eyes need operation, it is best not to operate on the second eye until permanent results have been produced by the first operation. Such a condition will result in from one to three months after the operation.

He next describes his tucking operation with the tendon tucker, first introduced by him, and the method of suture which he now uses is given. He believes that a bow knot should be placed in the sutures, so that the effect may be increased or diminished as desired on the days following the operation. The eyes should be kept bandaged for a week. Sutures are not removed until eleven to fourteen days after the operation. The operation is best done under local anesthesia. The swelling lasts for a month, and rarely for two or three.

Todd enumerates the advantages of the tucking operation over the ordinary advancement. Finally, several cases are reported illustrating these procedures. G. S. D.

**Gonorrheal Iritis as a Manifestation of an Old Latent Gonococemia, Diagnosed by the Complement Fixation Test—
Treatment With Bacterins.**

REBER, WENDELL, AND LAWRENCE, GRANVILLE A. (*Ophthalmic Record*, January, 1915). Three cases are reported in which iritis occurred as a manifestation of a latent gonorrhea. The diagnosis was established by the use of the complement fixation test for the gonococcus. Subsequent treatment with serums and bacterins gave prompt and gratifying results.

The first case was a man, thirty-seven years of age, with iritis. He gave a history of infection fifteen years previously.

He stated that after treatment his physician had pronounced him cured. He was put on injections of Neisser serobacterin (mixed). Improvement rapidly ensued. In ten days the eye was quiet and normal. His vision returned to normal.

Second case, male, thirty-two years old. For some years previous had polyarthritis rheumatica, and there had been two previous attacks of iritis.

A latent gonococcemia may lurk in the body for many years without producing symptoms. The importance of this as a cause of iritis is very great, and a complement fixation test should be resorted to in all doubtful cases. In the treatment of these conditions, some form of bacterin should be used.

Iritis as a manifestation of a latent gonococcemia is probably a much more frequent picture than is generally thought.

G. S. D.

Spheric Aberration—The Importance of Its Correction in Applied Refraction.

MASON, ALBERT B. (*Ophthalmic Record*, January, 1915), calls attention to the importance of spheric aberration, and describes the disc which he uses for proper correction.

G. S. D.

Salvarsan in Ophthalmology.

STIEREN, EDWARD (*Ophthalmic Record*, January, 1915), says reports of harmful effects on the eye of salvarsan and neosalvarsan are becoming less frequent. Nevertheless, occasional cases where blindness or impaired vision has followed its use are appearing from time to time.

Among three hundred and seventy syphilitic cases treated with salvarsan, five ocular muscle palsies occurred, while Stern found in five thousand syphilitics untreated with salvarsan only three instances of the same kind. A suspicious circumstance, too, is that the paralysis came on, in the recorded cases, at the same time, two or three months after the use of the drug.

Goerlitz, Geronne and Gutmann attempt to explain the occurrence of early palsies by stating that salvarsan seems to change the course of syphilis so that the so-called tertiary symptoms are likely to appear much earlier than when it has not been used.

Stieren goes on to describe other cases of muscle palsies of the eye.

Fordyce has given salvarsan in more than one thousand cases, and has come to the conclusion that it has no injurious effect on the eyes whatsoever. Nevertheless, according to the literature, experience not infrequently reverses this opinion.

Stieren has observed a number of cases of optic neuritis which improved more rapidly under salvarsan than cases treated in the past with mercury. He believes, however, that more secondary atrophy occurs, and has no hesitancy in stating that salvarsan promotes primary optic atrophy when it has already begun. For primary optic atrophy intraspinal salvarsanized serum should be the method employed, also for optic neuritis and secondary atrophy and oculomotor paralysis. These patients should, however, be warned that their eyesight may be worse as a result of the injections. G. S. D.

A Case of Keratoconus Cured With High Frequency Spark.

CARPENTER, E. R. (*Ophthalmic Record*, January, 1915). Patient showed a vision of 10/200 with a — 10.0 sph. The conical condition of the cornea was typical. The eye was cocainized and high frequency spark employed to produce an opacity in the conical area in each eye. Several treatments were given, and a slight scarring was produced. With — 10.0 sph. vision in each eye was 20/50. With an astigmatic correction later, vision came up to 20/30 — in each eye.

Carpenter believes this treatment recommends itself on account of its simplicity, freedom from danger of complications; that it is easier to repeat it when necessary than in the ordinary cautery operation, and the vision as a result is exceptionally good. The writer states that this treatment produces a localized interstitial inflammation, which later forms a slight scar. G. S. D.

Melanosis of the Conjunctiva—Report of a Case.

RANDOLPH, ROBERT L. (*Ophthalmic Record*, January, 1915). reports a case which showed in the lower conjunctival sac of the right eye three patches of pigment. These lay in a straight line along the inner border of the lid, nearly invading the ocular conjunctiva. They were sharply marked and of different sizes. The caruncle was a much deeper black than the

other patches. In the left eye there was one small patch in the lower conjunctival sac, and the lower half of the caruncle was black. These spots had existed from childhood. They showed no elevation, and were only apparent in the palpebral conjunctiva and caruncle.

Melanosis of the conjunctiva is a very rare condition. In a case examined microscopically by Beauvieux the pigment appeared to be most abundant in the basal membrane of epithelium. The pigment was either free or in the epithelial cells. The pigment cells were very small. Deeper there were areas containing pigment cells. The color varied in shade from straw to India ink.

Randolph is not satisfied with the explanation of the genesis of the condition. According to Schann and Wolfrum there exists in the conjunctiva cells which possess the property of either forming pigment or of attracting it to the edge of the protoplasm under the influence of certain causes. The slightest irritation which would produce no effect on ordinary cells would produce on these specially predisposed cells a pigmentary reaction.

G. S. D.

A Method of Destroying the Lacrimal Sac in Chronic Dacryocystitis.

GIFFORD, H. (*Ophthalmic Record*, January, 1915), first used a Paquelin cautery for burning out the interior of the sac. Eight years ago he began to use trichloroacetic acid, as it is pleasanter of application. Now, after opening it, he packs the sac with a piece of iodoform gauze.

If it is important to complete the operation quickly, he applies two or three drops of trichloroacetic acid and scrubs the interior of the cavity thoroughly. This procedure he carries out twice at one sitting. After the sac is dried out and syringed with some cleansing solution, the cavity is filled lightly with aristol powder. Zinc ointment is put on the skin and a light bandage applied.

Where the time of the patient is less valuable, the operation is done in two stages: first, cutting into the sac and packing it; second, after cocainization, swabbing out with trichloroacetic acid.

Gifford is satisfied with his results of this procedure. He

closes with the following statement: "I have never exsected a lacrimal sac and haven't the slightest intention of doing so."

G. S. D.

Scleral Puncture for Expulsive Subchoroidal Hemorrhage Following Sclerostomy—Scleral Puncture for Postoperative Separation of the Choroid.

VERHOEFF, F. H. (*Ophthalmic Record*, February, 1915).
Expulsive hemorrhage from the choroid is not frequent, but when it occurs it always leads to the loss of the eye. When occurring after operation, it is most frequent following iridectomy for glaucoma and less frequent after cataract extraction. It also occurs after sclerostomy, and will probably be found to occur as often after this operation as after simple iridectomy. Expulsive choroidal hemorrhage also sometimes occurs spontaneously.

In a number of cases of this sort examined pathologically, Verhoeff has found the hemorrhage chiefly confined to the subchoroidal space. The hemorrhage pushes up the choroid and compresses the vitreous. There is also more or less hemorrhage from the ciliary body into the anterior vitreous, not from direct extension of the choroidal hemorrhage, but probably due to the increased intraocular pressure. In the cases where the hemorrhage breaks through the choroid and pushes the retina and vitreous out of the eye, enucleation should be done at once.

The following case is reported: A man of sixty years, whose right eye showed a chronic noninflammatory glaucoma. Tension, 72 millimeters. After treatment with miotics, sclerostomy combined with a large buttonhole iridectomy was performed. No difficulty was encountered. Just as the conjunctival sutures were to be inserted, vitreous began to pour from the wound and the eye became extremely hard. Four hours later Verhoeff made a puncture with a cataract knife on the nasal side 10 millimeters from the corneal limbus. A small amount of blood escaped. From the second puncture made on the outer side a large quantity of blood flowed and the eye partly collapsed. It soon filled up again. A third puncture was then carried out.

Thirty-six hours later pain set in and a considerable amount

of blood was discharged, but on the next day the anterior chamber was established and contained a large hyphema.

Nine days after the operation the tension was normal and the eye quieting. On the eighteenth day the tension was normal to the touch and the vision was 20/200. Two weeks later there was a well marked bleb at the site of the sclerostomy. The tension was normal. The ophthalmoscopic examination showed clear media and a normal fundus.

The immediate effects of the scleral punctures were apparently unsatisfactory, as fresh bleeding ensued. The writer assumes that the bleeding vessels finally became thrombosed, and the pressure of the newly secreted aqueous was sufficient to force the blood out of the scleral opening and push the choroid back in place.

This procedure should always be tried, as the only alternative is enucleation. In another case he would endeavor to have stopped the flow of vitreous by finger pressure and to make the scleral punctures as quickly as possible. He would then make a small angular incision in the sclera and excise the apex of the angle. If the hemorrhage did not cease he would inject normal salt solution into the vitreous in an attempt to force the choroid back into position.

Verhoeff also advises scleral puncture in persistent cases of postoperative separation of the choroid. G. S. D.

The Influence of Heredity in the Development of Strabismus— A Study of Eighty-one Private Cases.

REBER, WENDELL (*Ophthalmic Record*, February, 1915). Because of the varying views as to the pathogenesis of strabismus, the proper place to be allotted to heredity has by no means been fixed. As the great majority of humans are born hypermetropic and yet do not squint, the idea that the heredity of strabismus naturally follows the heredity of hypermetropia must be abandoned. Anomalies in the anatomic formation of the orbit due to inheritance may have some influence.

The writer cites a number of authors who have laid special stress on the influence of heredity, and gives the particulars of a family in which this cause was especially marked. He then reports on eighty-one cases observed in private practice.

Six were of divergent strabismus, and five showed strong

hereditary tendencies. Of the total eighty-one cases, sixteen per cent stated that no member of the family exhibited any degree of strabismus. In thirteen cases sufficient inquiries were not made. Of the remaining fifty-five, forty-seven per cent gave evidence of direct heredity, eleven per cent gave evidence of direct and collateral heredity, and nine per cent gave evidence of collateral heredity alone.

Thus sixty-eight per cent of the whole series gave some manner of evidence of hereditary involvement. This figure is only exceeded by that of Jensen, who found seventy per cent in his series.

Such a study is best carried out on private cases.

The practical import of this study is the necessity of paying special attention to the members of those families in which squint has been known to occur. G. S. D.

A New Eye Speculum.

GREEN, A. S., AND GREEN, L. D. (*Ophthalmic Record*, February, 1915), describe a speculum which appears to be a modification of the Murdock speculum, but is furnished with a handle which is controlled by an assistant.

With the tonometer the writers have repeatedly demonstrated that the intraocular tension will not be raised in the least by the most forcible squeezing of the patient when the instrument is properly held. It is applicable to every form of intraocular operation. G. S. D.

A Case of Retinal Detachment—Report of a New Operative Procedure.

CURTIN, THOMAS HAYES (*Ophthalmic Record*, February, 1915), reports a patient who showed in the left eye a large detachment of the lower and outer part of the retina, without a history of trauma. No improvement took place under medicinal treatment. A scleral button of 2 millimeters was then removed over the site of the detachment, as far back as possible, between the inferior and external rectus muscles. The choroid and retina were not punctured at the time. A moderate pressure bandage was applied, and the patient was put to bed for ten days. No change took place.

Next, twenty-five minims of fluid were withdrawn from the subretinal space with an aspirating syringe. The retina

then fell back into place, and there was no reaction following.

The vision of the eye improved from hand movements to 20/30. The field became normal. The conjunctiva over the scleral opening continued to show a slight chemosis. The last observation reported was some six weeks after the aspiration of fluid, and the retina was still reattached.

The writer prefers aspiration to incision of the choroid and retina as practiced by Parker and others, as it produces less traumatism, no injury to the retina, no loss of vitreous and no marked reaction. Also, the procedure may be readily repeated.

G. S. D.

Conservative Treatment of Penetrating Wounds of the Eyeball.

BULSON, ALBERT E. JR. (*Ophthalmic Record*, February, 1915). The treatment of each case of penetrating injury of the eyeball must be decided on its own merits.

Cases illustrating penetrating injuries are reported.

In no other class of cases is intelligent judgment more necessary than in these. Bulson believes that if there has been considerable loss of vitreous in connection with the injury of the ciliary region, enucleation or one of its substitutes is indicated. The same is true of extensive injuries of the ciliary body, iris and lens. Injuries to eyes that are already the seat of a pathologic condition are also more likely to require immediate removal.

When treating penetrating wounds of the eyeball it is important to coapt the wound edges as nearly as possible and prevent the incarceration of iris or ciliary body.

Scleral stitches are difficult to place and are unnecessary. The conjunctiva should be slid over the wound and carefully stitched. Tincture of iodine or twenty-five per cent solution of trichloroacetic acid is valuable in counteracting infection. Subconjunctival injections of cyanid of mercury have apparently been valuable.

G. S. D.

The Operative Treatment of Acute Glaucoma.

BURNHAM, G. HERBERT (*Ophthalmic Record*, February, 1915), reports a case of glaucoma operated on with Bardsley sclerectome. This instrument enables one easily, quickly and accurately to make the trephine opening. When this instru-

ment is used an iridectomy is more easily performed than through the trephine opening. G. S. D.

A Spectacle Frame for Tennis Players and Farmers.

GIFFORD, H. (*Ophthalmic Record*, February, 1915), describes a spectacle frame which contains over the upper half of each lens a metal gutter which prevents the perspiration from running into the eyes. G. S. D.

ABSTRACTS FROM GERMAN OPHTHALMIC
LITERATURE.

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**Investigations Concerning the Compressibility of the Eye Into
the Orbit in High-Grade Anomalies of Refraction.**

GUTMANN (*Zeitschr. f. Augenh.*, April-May, 1914) continues his researches with the piezometer. In high-grade myopia the capacity of the globe of being pushed back into the orbit by a weight of 25 grammes is diminished 0.3 to 0.4 millimeters in comparison with that of the emmetropic eye. In a few cases of axis myopia there is a tendency to greater compressibility into the orbit (2.0 to 3.0 millimeters) as well as greater mobility for rapid and unlimited changes in direction, on account of extraorbital protrusion, whereby the posterior segment of the globe attains a greater mobility.

Ambialet has found the normal protrusion of the corneal apex from the temporal orbital margin to be 7 to 15 millimeters. Birch-Hirschfeld found the difference in protrusion in the same individual to vary as much as 2 millimeters. Gutmann, using the Hertel exophthalmometer, found in high-grade myopes which protruded 14 to 15 millimeters, the average orbital compressibility by a 25 gramme weight to be 0.3 millimeter less than in the normal eyes. If the exorbital pro-

trusion and degree of myopia were equal in the two eyes, the compressibility remained the same; with different exorbital protrusion, the orbital compressibility was unequal. In cases of protrusion of 17 to 19 millimeters the compressibility by a weight of 25 grammes increased, approaching that of emmetropic eyes. Therefore, the enlarged globe in medium and lesser exorbital protrusion must overcome a very great resistance from Tenon's capsule and the muscles. In a few cases of high-grade myopia with moderate exorbital protrusion, great compressibility was present from marked emaciation and loss of orbital fat.

In myopic eyes of high degree with divergence, the sclera is separated from the temporal orbital margin by a small space, but the posterior portion of the globe is directed nasally; therefore, the orbital compressibility is greater in the direction of the orbital axis, on account of lessened resistance in the undisturbed position of rest of the globe, i. e., without contraction of a muscle. In all other variations from the position of rest, in contraction of the externus, superior, or internus, the compressibility is much diminished.

2. In hyperopes of 4 to 10 D. and in hyperopic astigmatism, the measurements were taken on squinting eyes, with the position of rest attained by looking directly upward (patient recumbent), in order to exclude limitation of orbital compressibility through muscle contraction. Measurements during strong muscle contraction of one of the recti, especially of the internus, always showed diminished values, which he explains by a mechanical hindrance through increased muscle volume.

"In hyperopia of high degree the orbital displacement of the globe was much greater than in emmetropia. In hyperopia of both globes it was equal on the two sides, and in a greater hyperopia of one eye it was greater than on the other side. The difference between high myopia and hyperopia was very striking." His explanation is that in axis hyperopia there is a diminution of the entire globe, the sagittal diameter is most often shortened, and the cornea normal.

3. In asymmetry of the face and anisometropia, reference to the findings of Hess in school inspection showed that about one-half of all nearsighted and hyperopic children had unequal refraction in the two eyes.

Donders emphasized cranial asymmetry as a cause of anisometropia: "On the side of the longest visual axis, the orbit and the eye are farther forward. If the right and left side differ in this particular, there is usually a difference in refraction."

Landolt found on the side of strongest refraction a more markedly arched forehead.

Horner maintained that the face on the side of myopia was long and narrow; on the side of hyperopia short, flat, broad; and the curve of the brows over myopic eyes was flatter.

Stilling found a broad face in myopia, narrow face in hyperopia.

v. Ash concluded that the orbital index was greater in hyperopia than in myopia.

The measurements of Ambialet and Fuerst usually gave a broad face with oval and a long face with round orbits.

Brachycephalics have flatter orbits and diminished exorbital protrusion. Dolichocephalics have a greater exorbital protrusion.

Gutmann's conclusions were: In asymmetry of the face, even without anisometropia, the bulbar displacement into the orbit varies, the difference being greater in anisometropia. In high degrees of anisometropia, also in myopia of different degrees in the two eyes, the difference is marked. In several of these cases, asymmetry of the skull and a difference in the height of the eyebrows was established.

4. Glaucoma and secondary glaucoma yielded a diminished displacement into the orbit whenever the intraocular pressure rose to about 40 millimeters (Schiötz), which was restored to normal after successful operations for the relief of tension. Gutmann explains these cases by an increased volume in the globe and obstruction of the blood and lymph outlets.

J. W. C.

Experimental Investigations Concerning the Relations Between Inclusion Blepharitis and Trachoma.

GEBB, H. (*Zeitschr. f. Augenh.*, June, 1914), publishes the results of his experiments in a case of inclusion blepharitis in a ten-day-old child with the following history: Five days after birth both eyes began to secrete pus, and it was admitted

to the hospital. No gonococci or other bacteria were found. The mother had after birth abundant fetid discharge, which soon became better, and no gonococci were found, nor was a history of infection obtainable. Cultures from the secretion yielded a few white staphylococci. Smears of the epithelium showed numerous inclusion bodies. Smears from the cervix of the mother gave no inclusion bodies. No treatment was given the child for several days.

On the third day, conjunctival epithelium was transferred to the conjunctiva of patient one. Nine days afterward the conjunctival secretion from the child was transferred to patient two. Treatment of the child was then begun on the tenth day, and it was discharged in seven days with no demonstrable inclusion bodies. Shortly before its discharge, epithelium was transferred to patient three. After almost a year the examination of the child showed both eyes normal, no scar formation and no pannus.

Gebb's technic consisted in four to six small incisions parallel to the Meibomian glands and transference of the epithelium from the scarifier or the secretion from the platinum loop to the conjunctiva of the patients.

Patient one was a case of glaucoma with normal conjunctivæ, showing isolated staphylococci and xerosis bacilli. On the third day there was a distinct injection of the right (inoculated) lower lid, and inclusion bodies were demonstrable. On the fourth day the conjunctiva was slightly swollen, and isolated inclusion bodies were found. On the sixth day there was marked lachrimation, with moderate secretion containing numerous inclusion bodies. Cultures yielded only a few staphylococci and xerosis bacilli. On the seventh day the eye was very much inflamed, secretion abundant, involvement of the upper lid, but no follicles or trachoma bodies demonstrable. The cornea was not affected. The patient left the hospital. On the twelfth day he returned with the right eye exhibiting marked secretion, lachrimation and conjunctival edema, with fleshy swellings on the conjunctiva and fine follicular hypertrophy; inclusion bodies were numerous. On the thirty-first day the patient left the hospital without having had any treatment. After twenty-one months there were no trachomatous changes and the eye was free from inflammation.

Patient 2.—Tabetic atrophy with normal conjunctiva, isolated staphylococci and xerosis bacilli. Secretion was transferred to the conjunctiva of both upper lids. On the fourth day there was conjunctival injection of both upper lids; no inclusion bodies. On the fifth day there was increased inflammation with inclusion bodies. On the twenty-fifth day subsidence began, and on the thirty-fifth day the patient was discharged. There was no follicle development—only papillary hypertrophy; growths at limbus still present, and inclusion bodies still demonstrable. No sign of trachoma during twenty-one months.

Patient 3.—Phthisis bulbi with normal conjunctiva, isolated xerosis bacilli. Transfer of conjunctival epithelium from the child when no more inclusion bodies could be found. There were no inflammatory changes during fourteen days of observation. No inclusion bodies were found in several smears.

Patient 4.—Control of patient 3. No inflammation in fourteen days.

The disease disappeared in all cases without treatment.

Gebb's conclusions were that both secretion and conjunctival epithelium from inclusion blennorrhoea of the newborn can cause a specific infection in the adult, which recovers without treatment and without causing trachoma, even in after years, and that the two diseases are not identical; also that after recovery the conjunctiva does not carry concealed virus, because he obtained no infection from epithelium taken after recovery of the child.

In order to investigate the possible theory that perhaps the virus of inclusion blennorrhoea after a certain acclimation in the conjunctiva of the adult might then produce trachomatous changes, Gebb inoculated patient five from patient one while in the first stages of the inflammation (five days after infection), and patient six at the height of inflammation (fifteen days after infection).

Patient 5.—Conjunctiva clean; isolated staphylococci. Transfer of conjunctival epithelium from patient one to the right lower lid. Fourth day, light hyperemia no inclusion bodies. Seventh day, increased inflammation with slight swelling and a few fine follicles; inclusion bodies present. After seventeen months there had been no appearance of trachoma.

Patient 6.—Transfer of conjunctival epithelium from patient one at the height of inflammation to the lower lid conjunctiva. Fifth day, distinct inflammation with inclusion bodies. After recovery there was no disease visible in eighteen months.

Patient 7.—Conjunctiva normal; was inoculated with conjunctival epithelium from patient five at the height of disease. Fourth day, distinct hyperemia with extension to the upper lid and globe; inclusion bodies present. The course of the disease was similar to that of the other cases. Fifteen months later the conjunctiva was absolutely devoid of trachomatous changes and the cornea was clear.

Patient eight was infected with conjunctival epithelium from patient six at the height of the inflammation (sixteenth day). Third day, hyperemia, followed by the usual course of the disease, with spontaneous recovery after several weeks. Twelve months after infection the eye showed no trachomatous changes.

From investigations concerning the viability of the virus of inclusion blennorrhoea, he concluded that room temperature and low temperature destroyed viability. It is also filterable through the finest Berkefeld filter.

J. W. C.

Ectropium Uvae Congenitum.

SAMUELS, BERNARD (*Zeitschr. f. Augenh.*, April-May, 1914), discusses congenital uveal ectropium and gives a report of a case seen in Elschnig's clinic in Prague. The patient was called "double pupil" when a schoolboy. The military medical examiner noticed the "double pupil" when he pronounced the patient unfit on account of his poor physique. He had been a glass blower since eighteen years of age, and his left eye had been constantly toward the fire. Ten years ago he noticed failing vision in the left eye. Vision had diminished still further in the last three months. Right eye, normal except beginning cataract. Left eye, diverging strabismus. Over the upper half of the corneoscleral margin there was a narrow pigment zone, consisting of yellowish brown superficial pigment granules. Pupil round, central, with normal reaction to light. The iris was of a pale gray brown color—its trabeculae distinct; its ciliary portion appeared smooth and occupied by finely distributed pigment, also pigment in groups of va-

rious sizes in the form of nevi. No pupillary membrane was visible.

In the upper inner third of the pupillary margin the pigment epithelium extended over the iris to the iris circle, where it took an irregular lineation, as seen under the loup. It appeared like black brown velvet with distinct radiations. Next to this portion there was a narrow zone, distinct in pigment, of a lighter yellowish brown color. The patient died of tuberculosis, and both eyes were subjected to pathologic study—for the results of which the reader is referred to the original.

His case exhibited a condition which had not yet been established, viz., the close connection of the peripheral portion of an everted retinal pigment layer with the iris stroma.

He traced the malformation to the third month of fetal life, when the pars ceca of the ocular vesicle has developed and comes into contact with the periphery of the iridopupillaris. About a month later the matrix of the sphincter (from the pars ceca) begins to imbed itself in the mesoderm of the lamina iridopupillaris. The transition zone of the pars ceca is now in contact with the posterior surface of the peripheral portion of the iris and pupillary membrane. When this transition zone remains persistent the two layers of the pars ceca will accompany this point in its advance on the anterior surface of the iris.

"In the meantime the cells of the pigment layer proliferate in order to cover the ever increasing area. At the same time the pupillary membrane begins to disappear at its center, and its thick peripheral margin falls back over the everted uvea to form the delicate anterior membrane."

J. W. C.

Dystrophy of the Cornea in Tabes.

FUCHS (*Centralbl. f. prakt. Augenheilk.*, August and September, 1913) saw the patient, a man of thirty-eight years, in October, 1911. The patient had had a primary infection in 1893 and much subsequent treatment, but the Wassermann reaction was still positive. The pupils did not react to light, and their reaction to accommodation was scarcely noticeable. The discs were pale and the corneæ somewhat anesthetic, with a dullness in the lower quadrant. The surface over this duller portion was smooth, however. In the deeper layers of this quadrant were numerous fine opacities. These were dirty

gray or brown in color. There was no question about this being a typical case of tabes. Fuchs considers the corneal opacities as part of the tabetic process, since this affection can produce degenerative changes in organs other than the nervous system.

M. W. J.

Diagnostic Errors.

HOOR (*Pester med. chir. Presse*, 1910, No. 2; Abst. in *Woch. f. Ther. u. Hyg. des Auges*, November, 1914) refers to points in the differential diagnosis between keratitis e lagophthalmo, keratitis neuroparalytica, keratomalacia and xerosis of the cornea and conjunctiva.

Keratitis e lagophthalmo is due to insufficient closure of the lids, with consequent drying of the epithelium and suppurative keratitis. The affection may be prevented by furnishing the cornea with adequate protection.

Keratitis complicating the severe forms of Basedow's disease may lead to rapid destruction of the cornea, but the onset and course are different from those of keratitis e lagophthalmo.

A similar form of keratitis may complicate cholera. Dessication here is due to decrease in ocular fluid content.

Keratitis neuroparalytica is the result of a localized disturbance of nutrition, and should not be confused with keratitis e lagophthalmo or keratitis xerotica. Cessation of the lacrimal secretion in a normal conjunctiva never leads to corneal dessication; the reflex lid action is always bilateral, and, moreover, cases have occurred in which a fifth nerve palsy complicated a third nerve paralysis with ptosis, and nevertheless a neuroparalytic keratitis ensued.

The keratomalacia frequently observed in infants suffering with ailments often terminating fatally should not be classed with those of keratitis e lagophthalmo, for continuous closure of the lids proves unavailing; nor can it be regarded a neuroparalytic keratitis because of its rapid, acute course.

According to Nimier and Despagnet, it is a softening of the cornea and may be followed by keratoconus.

Xerosis of the cornea and conjunctiva may occur in a mild form, xerosis epithelialis—or in a severe form, xerosis parenchymatosa. The former is frequently epidemic in character. Both varieties may be regarded as a localized affection, or part of a general nutritional disturbance. The epithelial type probably results from the dazzling occasioned by direct or reflected

sunlight. In parenchymatous xerosis the local cause consists in the complete cicatrization of the conjunctiva consequent to various influences. Xerosis in the main resembles the drying up of the cornea observed in cholera patients. In India and China the affection is found in individuals with impaired health due to opium. It is identical with Brazilian ophthalmia and cachectic xerophthalmia. A. C. S.

Congenital Changes in the Sclera.

PETERS (*Centralbl. f. prakt. Augenheilk.*, August and September, 1913) reports finding this anomaly in an eye which had been in alcohol for thirty years. In an eye having a congenital staphyloma of the cornea he found a cornified area adjacent to the limbus, but which was not elevated above the surrounding sclera. Section showed it to be transparent, and its dark color was due to the usual pigmentation of the eyeball. He calls attention to the fact that Seefelder, who reported a similar case, found, with the thinning of the sclera as in this case, congenital opacity of the cornea. M. W. J.

Cysts of the Sclera Due to Traumatic Inclusion of Epithelial Tissue.

LAPERSONNE (*Centralbl. f. prakt. Augenheilk.*, August and September, 1913) found multilocular cysts which had developed in the sclera following a penetrating injury. The cysts were lined by conjunctival epithelium and communicated with prolongations extending into the cavity of the eye in the region of the ciliary body and iris. All the prolongations showed the same type of lining, i. e., conjunctival epithelium.

Lapersonne believes that an invagination of conjunctival epithelium occurred at the time of the accident, and that the epithelium later proliferated. The proliferation led to a stretching and eventual rupture of the badly scarred sclera, with formation of the multilocular cysts. He believes that the hypertension in this case was an important factor in the cyst formation. M. W. J.

A Contribution to the Ocular Changes in So-called Multiple Neurofibromatosis.

FEHR (*Centralbl. f. prakt. Augenheilk.*, August and September, 1913) describes in detail two cases of this disease

which came under his observation. The first, a female, in whom the growths on the lids and adjacent parts of the face had completely nullified the use of the eyes, was relieved by means of a plastic operation. Histologic examination showed no traces of nerve fibers, which bears out the assertions of other investigators who found no trace of such tissue in the end stages of this disease. The second patient, a male, developed a marked neuroretinitis and loss of vision in the right eye. A Krönlein operation revealed nothing, and the writer concludes that if this ocular condition was really due to a very small fibrous growth in the sheath of the optic nerve, we have here the first unimpeachable reported case of fibroneuroma of the optic nerve in a person suffering with multiple neurofibromatosis.

M. W. J.

Vossius' Ring Opacity of the Anterior Surface of the Lens.

PURTSCHER (*Centralbl. f. prakt. Augenheilk.*, August and September, 1913) reports five cases, and calls attention to the fact that the average age of his patients was 16.2 years. The average age of the patients reported in the literature was 17.5 for twenty-five of the thirty-one cases. No ages were given in the other five, although the facts would suggest that these also were young individuals. He believes, with Steiner and others, that the lesion is not due simply to pressure applied anteriorly to the cornea, but that at the moment of the injury the tension of the aqueous is raised. This forces the iris against the lens for an instant. Similarly increased tension of the vitreous, due to pressure applied posteriorly, is reported in a case by Steiner to have caused the same lesion.

M. W. J.

Recurrence of Iritis.

TERLINCK (*Zeitschr. f. Augenh.*, June, 1914) reports three cases of iritis (following salvarsan) in eyes which already exhibited a syphilitic lesion. His first case was a female, twenty-six years old, who had had a roscola papulosa after an infection in December, 1910. She received sixty cubic centimeters salvarsan intramuscularly, which was followed by marked improvement.

In February, 1911, she came with diminution of vision and frontal headaches. The ophthalmoscope revealed a double

optic neuritis. Left eye, vision equaled $1/10$; right eye, vision equaled $4/10$.

The patient returned June 17th, having received four days previously sixty cubic centimeters of salvarsan intravenously. In three days a typical iritis in the left eye appeared. June 20th the patient received another injection of sixty cubic centimeters, and in two days the iritis was better. June 26th sixty cubic centimeters, and on July 10th the iritis had vanished and the papillitis was better, with vision in left eye $2/10$, and in right eye $6/10$. On July 13th the patient received forty cubic centimeters salvarsan. In two days she noticed diminution of vision in left eye. She came to the clinic July 17th with a hemorrhage into the vitreous. Potassium iodid and warm compresses were prescribed. In 1912 the vitreous had cleared so that an atrophic spot was seen at the site of exudate. Vision equaled $6/10$. In December, 1912, the patient appeared with recent diminution of vision in left eye. There was an exudate in the papilla with extension to Cloquet's canal. Salvarsan and enesol were given. Vision equaled $3/10$. In April, 1913, the exudate had diminished. Left eye, vision equaled $6/10$; right eye, $9/10$. Wassermann plus.

Case 2 was a fifty-six-year-old man with syphilis of eleven years' standing. In 1907 and 1910, he was treated by Terlinck for iritis in left eye. He also had several courses of mercury from his family physician, followed by enesol injections. In December, 1911, the injections were again begun (six cubic centimeters every two days). After three injections left eye was attacked by iritis, which became worse after the fourth injection. Terlinck saw the patient in January, 1912, and found pericorneal injection, hyphema, increased pressure and great pain. Intravenous salvarsan caused all symptoms to disappear as if by magic. Wassermann negative.

Case 3.—Man twenty-eight years old, chancre in 1912. Salvarsan and mercury oil had been begun on the eighth day, but was conducted very irregularly. He received ten cubic centimeters of mercury salicylate, and four days later he came with iritis. He was referred to the dermatologic clinic and he then disappeared from observation.

Terlinck explains the short interval elapsing between the injection of salvarsan and the appearance of the iritis as com-

pared with the one and one-half to four months in the case of the neuritides to the fact that the spirochetes in the anterior chamber are much more accessible to the stimulation by the salvarsan than those causing "Meningorecivide" and nerve involvement. He calls attention also to the well known fact that iritis has also occurred during an active inunction treatment.

J. W. C.

Choked Disc and Abducens Paralysis in Chlorosis.

MELLER (*Centralbl. f. prakt. Augenheilk.*, August and September, 1913) speaks of the danger of making a diagnosis of brain tumor when choked disc is complicated by headache, dizziness, vomiting and muscle paralysis. He reports a case in a girl of fourteen years who had chlorosis. The same symptom complex has also been observed in otitis media, after severe hemorrhages and after tooth extraction. Its occurrence in such conditions can best be explained on the assumption that a thrombosis has occurred in the sinus cavernosus. Just in chlorosis we find a marked tendency toward clotting and therefore a tendency toward thrombosis. Similarly thrombosis of the central vein of the retina has been observed in chlorosis, and the assertion is made that some cases of so-called optic neuritis in anemia, in which retinal hemorrhages were found, were cases of thrombosis of the central vein. Meller gives a good prognosis regarding the nerve involvement in chlorosis, if the patient is seen early and given the proper treatment.

M. W. J.

"Angiomatosis" of the Retina (So-called v. Hippel's Disease).

STERN (*Centralbl. f. prakt. Augenheilk.*, August and September, 1913) saw the condition in a male Russian, twenty-one years of age. There had been gradual loss of vision, beginning one and one-half years prior to the onset of attacks of severe ocular pain. Five years later the eye had become shrunken and totally blind, with greenish discoloration of the pupil. In May, 1912, this eye (the left) was enucleated because of failing vision in the right eye. (No report concerning the enucleated eye.)

When seen by Stern the right eye was externally normal, the vitreous contained floating opacities and the vision was

one-third. A defect of the visual field was found down and in. The principal changes were seen in the region of the superior temporal vein and artery. The latter showed spindle and circular shaped dilatations. These communicated with similar structures by means of anomalous vessels. Stern likens the picture to a series of interlacing canals. The retina in this region had a bluish tinge and was covered with white and yellowish white spots; higher up these blend to form a yellowish white veil. Other portions of this area were grayish green or dirty gray in color. In places the grotesquely shaped vessels were wholly covered by the retinal masses. From one of the largest dilatations fine vessels could be traced into the vitreous. During the three months that Stern had the patient under observation the vision sank to fingers at four meters and the degenerated area in the retina approached more closely the center, while the contraction of the visual field encroached on the fixation point. He was able to observe in a hitherto uninvolved portion of the retina the gradual appearance of fine capillaries or what were perhaps newly formed vessels. These developed between branches of a vein and artery and tended to form an angioma-like nodule. He was not able to follow the case long enough to report regarding further changes, but he believes that in this instance he saw the first stage in the development of the dilatations seen in such numbers elsewhere in the retina. Stern insists that Goldzieher was the first to minutely describe a case of this kind and publish the same, although von Hippel had shown sketches of such a fundus somewhat earlier. Meller has recently brought evidence to prove this condition a real glioma corresponding to the glioma of the central nervous system. M. W. J.

Concerning Primary Tumors of the Retina.

ELSCHNIG (*Gracfe's Archiv. f. Ophthalm.*, Vol. 87, Part 2; Abst. in *Woch. f. Ther. u. Hyg. des Auges*, October 29, 1914). While glioma is considered the only known tumor of the retina, Elschnig cites two cases in which the pathology was different. In the first case the tumor was sarcomatous in type, with connective tissue and cystic new formation, resulting in a glaucomatous tendency. In the other there was a tumor of the nerve fibers of the retina which the author has designated neurinoma retinae. A. C. S.

Glaucoma and Diseases of the Cardiovascular System.

KUEMMEL (*Munch. med. Woch.*, 1914, No. 18; Abst. in *Woch. f. Ther. u. Hyg. des Auges*, November 5, 1914). Glaucoma is no local affection, but belongs to that group of diseases (coronary sclerosis, cerebral apoplexy, contracted kidney) dependent upon changes in the circulatory organs.

The author examined the blood pressure in seventy cases of glaucoma, and compared the findings with ninety control cases of variable ages. He found high blood pressure in glaucoma a frequent occurrence. In hemorrhagic glaucoma he found the blood pressure relatively lower. In glaucoma simplex, too, arterial tension is not so high as in the other forms of glaucoma. But these cases usually revealed other signs of cardiovascular disease—renal involvement. In eighty per cent of the cases increased blood pressure was present. Many other lesions resulting from arteriosclerosis also showed themselves, including cardiac enlargement, mitral insufficiency, systolic murmurs, accentuated second sounds, irregular heart action, and tachycardia.

From the standpoint of hypertension, the primary cause he ascribes chiefly to a hypersecretion or transudation.

If glaucoma is considered merely part of a general derangement, all operations for its relief must be regarded solely as palliative measures. Their chief value resides in the opening of the globe; this is more important even than iridectomy. In some cases venesection has proved beneficial.

The general treatment falls to the internist, often a difficult task, particularly in the working classes. A. C. S.

Concerning Tumors of the Hypophysis.

SCHOENHOLZER (*Wiener klin. Rundsch.*, 1914, No. 9; Abst. in *Woch. f. Ther. u. Hyg. des Auges*, November 5, 1914) reports the clinical and pathologic findings of a case in a twenty-year-old seamstress. At the site of the hypophysis there was found, exactly in the median line, a tumor surrounded by a fairly tough capsule, about the size of a hen's egg. Structurally it belonged to the chromophobe adenomatous strumas occurring not infrequently in nonacromegalic individuals, and which, according to Loewenstein, originate from the main cellular constituents of the hypophyseal tissue.

The ocular symptoms included optic atrophy with visual im-

pairment, terminating in total amaurosis, bitemporal hemianopsia, concentric contraction of the visual field with relative scotoma, divergence of the globes, impairment of convergence, sluggish pupillary reaction. The ocular macroscopic examination revealed the chiasm flattened out between the tumor and frontal lobe, and a complete destruction of both tracts by a transversely coursing vessel—the posterior cerebral artery.

There was involvement also of the left olfactory, left facial and both accessory nerves. The tumor first revealed itself clinically by a hemorrhage within the tumor.

Other symptoms present were drowsiness, apathy, headache, vertigo, on rare occasions vomiting, adiposis and cessation of menstruation.

A. C. S.

The Relationship Between Familiar Affections of the Optic Nerve and Those of the Nervous System.

FRENKEL (*Centralbl. f. prakt. Augenheilk.*, August and September, 1913) summarizes as follows:

1. Just as there are a number of types of familiar affection of the nervous system, there are many types of familiar optic atrophy. Some are hereditary and familiar (Leber type), others familiar, but limited to one generation. The latter appear to have a tendency to associate themselves in the same individual with familiar affections of the nervous system. We merely recognize a case of relationship between Friedreich's disease and hereditary atrophy and another of Leber's disease with a familiar affection of the nervous system. This relationship can be found in only one generation.

2. The organic affections of the nervous system reputed as giving rise rarely to an isolated form of optic atrophy (cerebral diplegia, malady of Friedreich) are found, on the contrary, very often amongst those who are afflicted with the hereditary or familiar form of optic atrophy. On the other hand, among the numerous affections which are frequently accompanied by the isolated condition of optic atrophy (tabes, sclerosis en plaques), one does not find many examples where coincidentally several cases of the two conditions are found in several members of the same family.

3. The familiar and nonhereditary affections of the optic nerve frequently appear in infancy (Tay-Sachs disease, retinitis pigmentosa and simple atrophy). It is perhaps the grav-

ity of these cases at their very beginning which explains why they are not observed in several generations. The familiar and hereditary affections of the optic nerve (Leber type) appear in adolescence or adult life, and are much more benign. Indeed, from the point of view of visual prognosis, the familiar type of affection which appears in infancy gives the graver prognosis, whereas those forms which appear later are susceptible to improvement.

4. Consanguinity appears to play an important rôle in families which show an association between cerebrospinal lesions and those of the optic nerve.

5. The infectious and inflammatory etiology does not appear to play a part in this group of cases. Accordingly, one ought admit the expression of Jendrassik, of "familial degeneration," to characterize the nature of the process and this syndrome.

6. As in the disease of Tay-Sachs, the "degeneration familiale" attacks simultaneously the central and peripheral neurons.

M. W. J.

Grafts From Lip, Mucous Membrane and Epidermis—Flaps in Diseases of the Cornea and Burns of the Eye.

DENIG (*Zeitschrift f. Augenh.*, June, 1914) reports seventy-one cases:

1. Trachomatous pannus, in which trachoma remains in the bulbar conjunctiva or cornea after the lids have recovered. Because pannus is a direct continuation of the trachomatous process upon the cornea, a simple excision of the conjunctiva around the cornea, cauterization or peritomy is without result. In many of his cases there were erosions, infiltrates and ulcers. He dissects up the conjunctiva and subconjunctiva thoroughly from the limbus, undermines six to eight millimeters and excises the broad strip. The graft is held in place by sutures. In about one-third of the cases he cauterized the pannus. The flap covers the limbus completely. A broad strip of the injured conjunctiva is thus removed and replaced by healthy mucous membrane.

While he has had some recurrences after one to two years (as a rule, the pannus remained healed during one to one and three-fourths years of observation) in these cases, he obtained success with epidermis, so that in cases which appear

obstinate he now has recourse to skin from the ear; in those which promise rapid recovery (burns and corneal diseases), the mucous membrane from the mouth suffices.

He has operated forty-two times on twenty-nine eyes with pannus. In thirteen cases a second graft was necessary; four cases from cutting through of the stitches, one case from infection of the stitches, one from hemorrhage under the flap, the remaining seven from recurrence of the pannus.

In all cases there was a marked improvement in symptoms, subsidence of the corneal affection with increase in vision. While not all cases showed disappearance of corneal vessels, they became much smaller and the corneal surface remained free from inflammation and erosion.

For a ring-shaped graft he uses a long 6, 8 or 10 millimeter wide flap from the lip or ear, cut somewhat concave. After it is fixed by seven or eight stitches, he trims it to fit the limbus. He uses the double bandage for five days, cleansing the eyes daily.

2. Burns.—Since his report in the *Muench. med. Woch.*, 1912, he has grafted mucous membrane from the lip in one lime burn, two ammonia burns, and one burn from the contents of a golf ball.

3. Diseases of the Cornea.—In addition to trachomatous causes, he mentions one case with scrofulous vascular ulcers, a chronic interstitial vascular process involving the epithelium with small multiple defects similar to trophoneurotic disease, a sclerokeratitis (negative Wassermann and tuberculin tests) with newformed vessels in the cornea, herpes-like efflorescences of a year's duration, etc.

He has also used lip grafts after transplantation of two pterygia, and warns against overlapping of the limbus.

He also reports an improvement of vision in vascular opaque corneæ from an old parenchymatous keratitis after ring-shaped graft taken from the lip.

J. W. C.

An Operative Procedure for the Reduction of Partial Staphyloma of the Cornea.

DIMMER (*Centralbl. f. prakt. Augenheilk.*, August and September, 1913) performs this operation on adults and older children under local anesthesia. In addition to the usual five per cent solution he uses one or two drops of twenty per cent

cocain. After separating the lids with a Panas retractor, the half of the corneal scar lying nearest the limbus is thoroughly curetted so that the epithelium is surely removed. A slightly curved flap with the convexity toward the limbus is then made in the corneal scar. Then, according to the size of the wound, one or two fine silk sutures are put into place with sharply curved needles. After raising the peripheral border of the wound with a fine forceps, one needle of a double armed suture is passed through it from within outward. The other needle of this suture is passed similarly from within outward at a point two or three millimeters from the first. The two needles are next passed through the convex flap, i. e., the other lip of the wound. A second suture is similarly placed from within outward.

If a more pronounced effect is desired where the ectasia is more marked, the needles are introduced at a greater distance from the borders of the wound. The curetted anterior surface of the scar unites with the posterior surface of the more centrally located flap. The folds and ridges which form on tying the sutures soon disappear. When the corneal scar is too thin there is danger of the sutures cutting through. Scars which are much thickened must be planed down with the curette or Graefe knife to avoid an unsightly ridge when the two surfaces are brought together. Where there is rise in tension, the iridectomy should be performed at a later date to protect the outlets in the angle of the anterior chamber from possible closure.

The advantages of the operation are:

A thickening of the scar of greater extent than when a conjunctival flap is used, and less tendency towards recurrence.

Reduction of curvature of the cornea with its associated astigmatism.

The thickened folds seen after conjunctival plastic are avoided.

M. W. J.

The Prophylactic Covering of Corneal Wounds With a Conjunctival Flap in Difficult Lens Extractions.

KRUECKMAN (*Centralbl. f. prakt. Augenheilk.*, August and September, 1913) recommends the use of a flap of conjunctiva over corneal wounds in cataract extraction. With slight modifications he follows the method of his predecessor, Kuhnt.

An incision is made parallel to and two or three millimeters from the limbus. This is undermined down to the limbus and along one-third the circumference of the cornea. With a scissors the flap is loosened along the limbus. We now have a band-like flap of conjunctiva, two or three millimeters wide, attached at both ends. The flap is then drawn down over the upper part of the cornea with the forceps and the points found at which the sutures are to be placed. The latter are placed one in each end of the flap and in the bulbar conjunctiva. A single loop is made and left loose. The flap is then pushed up out of the corneal region. The extraction having been completed, the flap is again brought down over the corneal wound and the sutures tied. The latter are removed in five days. Krückman recommends the procedure when operating on myopes, people with high blood pressure or high tension, or where there are fundus conditions due to changes in the blood vessels.

M. W. J.

The Statistics of Injury to the Eye Due to Iron Splinters.

ELSCHNIG (*Centralbl. f. prakt. Augenheilk.*, August and September, 1913) reports his observations on sixty-eight cases. He saw severe iridocyclitis in many cases where the extracted iron was germ-free by all known tests. He believes that this proves that many of the poor visual results in magnet extractions are due to the original injury and not to faulty technic in the use of the magnet. Hirschberg's rule, that every iron splinter should be extracted as soon as possible, holds good also for the lens. As an exception, he notes cases where a detachment of the retina has followed the entrance of the foreign body. Such cases should be kept under observation, as the prognosis is better after reattachment. He concludes by saying that we must use Hirschberg and giant magnet, according to the particular case.

M. W. J.

The Punch Operation for Glaucoma.

BUTLER, T. HARRISON (*Zeitschr. f. Augenh.*, April and May, 1914), recommends the Holth operation, but he prefers a smaller instrument. In chronic glaucoma he uses cocain; in acute and subacute glaucoma, gas-ether, never chloroform.

The conjunctival incision is begun as far as possible from the limbus and extended right and left to make a broad flap.

This is dissected free to the limbus with a blunt thin tenotomy scissors until the limbus ring appears. It is not necessary to spilt the cornea. The assistant lays the flap back on the cornea with a pointed forceps. The globe is fixed and the lance is introduced 1.5 millimeter from the limbus. The assistant lays the flap over the lance, which is then pushed into the anterior chamber. If it catches the iris and causes an iridodialysis, so much the better. The lance is withdrawn and the patient is instructed to look down. The flap is again laid back, the punch introduced and a small piece of sclera removed, encroaching exactly on the corneal margin. A small peripheral iridectomy follows, the iris being seized with a Liebreich forceps and cut with a de Wecker scissors.

In acute glaucoma he prefers to include the sphincter in the iridectomy. If no iridectomy is made, the iris is liable to obstruct the wound. A small piece of the iris, however, is useful in maintaining patulence of the defect. He also believes, with Henderson, that the iris wound never heals, and therefore it allows the escape of fluid. His results in trephining were never as good without iridectomy as with it. His third reason for preferring the operation with iridectomy is the migration of pigment cells into the fistula, thus forming a lining for it and assisting in keeping the channel open. He sews the flap with three silk sutures. Both eyes are bandaged forty-eight hours, then atropin is instilled once.

He reports the results of twenty-nine operations, with six failures, or 20.7 per cent. Of these, one was lost through late infection; in two, the particle of sclera removed was too small; one, in spite of good filtration, showed no diminution in tension; in one the defect was blocked by the iris, and in one the vitreous blocked the wound.

Two of his patients died in mania, one became melancholic after iridectomy for acute glaucoma, and the condition remained unchanged by operation on the second eye. In two cases the use of a mydriatic was the probable cause of the glaucoma. Three cases showed slight postoperative iritis.

J. W. C.

A Modification of Toti's Technic in Dacryocystorhinostomy.

KUHNT (*Zeitschrift f. Augenh.*, April and May, 1914) does not cut out the portion of nasal mucous membrane corresponding to the median sac wall which has been removed, "but forms

from it a flap the base of which lies on the resected margin of the frontal process in its entire extent." He grasps the periost-mucous membrane with forceps, raising it gently, and with a sharp bistoury places first the posterior, then the upper and, finally, the lower, peripheral incisions exactly corresponding to the removed nasal wall of the sac.

After it has been turned outward and lightly stretched, it is fixed with two or three double armed threads (two millimeter loop) at the top of the bone surface, the superfluous portion being removed with scissors. The threads are then brought one millimeter from the skin wound margin, through the nasal lip of the periosteal wound, but tied only after definite closure of the entire outer wound and not removed before ten days. Careful suturing is the sine qua non for the use of the flap; otherwise it not only will not heal, but the result of the entire operation will be jeopardized, because it will sink back into the nose and the opening will close, in addition permitting the formation of granulations. Kuhnt reports success in seven operations.

J. W. C.

A New Therapeutic Measure in the Treatment of Angular Conjunctivitis.

WOLFF (*Muench. med. Woch.*, 1914, No. 39; Abst. in *Woch. f. Ther. u. Hyg. des Auges*, October 22, 1914), in the treatment of this affection, tried a fluorescein zinc preparation obtained from fluorescein potassium and zinc sulphate. This is a yellowish red powder, its solubility in water being 1/1000 at room temperature. Zinc ions cannot be demonstrated in the aqueous solution; only after dissolving the ash in dilute HCL can zinc be demonstrated. The addition of acids, alkalis, serum or other albuminous solutions to this solution causes no precipitation. It is not injurious and contains sixteen per cent zinc.

The author tried this preparation in powder form in ten cases of diplobacillary conjunctivitis with very excellent results.

A. C. S.

A Method for the Rapid Absorption of Subconjunctival Hemorrhage and Ecchymoses of the Lids.

MOHR (*Deutsche med. Woch.*, No. 8, 1914; Abst. in *Woch. f. Ther. u. Hyg. des Auges*, November 5, 1914) injects a two

to three per cent sterile salt solution beneath the conjunctiva every day or every second day, according to the amount of hemorrhage. Two or three injections usually suffice. Daily instillations of five per cent dionin facilitate absorption. In lid ecchymoses salt injections are administered as in an infiltration anesthesia.

A. C. S.

A Reply to Mohr's Article on "A Method for the Rapid Absorption of Subconjunctival Hemorrhage and Ecchymoses of the Lids."

POLLACK (*Deutsche med. Woch.*, No. 10, 1914; Abst. in *Woch. f. Ther. u. Hyg. des Auges*, November 12, 1914) claims he obtained the best results with a weak pergenol solution. In many cases the desired result was obtained within twenty-four hours after a single injection. After squint operations such injections are also indicated.

A. C. S.

Results of Tuberculin Treatment in Ocular Tuberculosis.

V. HIPPEL (*Graefe's Archiv. f. Ophthal.*, Vol. 87, Part 2, 1914; Abst. in *Woch. f. Ther. u. Hyg. des Auges*, November 5, 1914) treated two hundred and forty-three cases of ocular tuberculosis and considers the most dangerous varieties those in which the ciliary body or iris are involved.

He reports seventy-five per cent cures, improvement in seventeen per cent, and no results in seven per cent. Recurrences occurred in thirteen per cent.

In uveal tuberculosis operative procedures should, if possible, be avoided. In case of necessity, the Elliot operation is preferable to iridectomy.

Recurrences are relatively most frequent in tuberculosis of the iris or ciliary body (twenty-six per cent).

A. C. S.

The Action of Eserin.

WESSELY (*Centralbl. f. prakt. Augenheilk.*, August and September, 1913) finds that, contrary to its usual vasoconstrictor action on the interior of the eye, eserine produces a reactive hyperemia of the ciliary processes and iris, accompanied by a qualitative change in the aqueous and a typical transitory rise in tension. These experiments made on rabbits corroborate the rise in tension which has been observed in human eyes with the occasional glaucomatous attack reported after the use of

eserin. That we do not see such attacks more frequently is perhaps due to the fact that a certain disposition towards hyperemia of the iris is essential to produce such threatening sequelæ. In the average eye, however, the exposure of the angle of the anterior chamber is of greater moment than the transitory hyperemia.

M. W. J.

Short Sketch From the History of Animal Ophthalmology.

SCHLEICH (*Centralbl. f. prakt. Augenheilk.*, August and September, 1913). The oldest known work on animal medicine was that entitled "Claudii Hermeri Mulomedicina Chironis." The extant manuscript was written in Latin in the fifteenth century and is a translation made in the fourth century from the Greek. It was edited by E. Oder, and published in 1901 by Teubner. It is valuable because it gives an insight into the veterinary literature of the Romans and Greeks, particularly the writings of Apsyrus, the most eminent veterinary of ancient times. He lived during the reign of Constantine the Great, writing about 334 A. D.

Publius Vegetius Renatus of Volterra published a work in the middle of the fifth century which drew largely from the "Mulomedicina Chironis." This work was edited by E. Lommatsch, and published by Teubner in 1903. Its complete title is "Publius Vegetii Renati Digestorum Artis Mulomedicinæ Libri." Next we have the "Hippiatrica," published in the tenth century.

In the "Claudii Hermeri Mulomedicinæ Chironis" many ocular conditions and their treatment, including congenital defects, are discussed. Blood letting is frequently mentioned. The "Hippiatrica" is similarly arranged. All these works describe ocular diseases and remedies as they are found in human medical literature. The knowledge of eye diseases in animals did not participate in the progress made by medicine, and especially ophthalmology, until the beginning of the nineteenth century.

Although special institutions for the study of diseases of animals were founded in all civilized countries in the eighteenth and nineteenth centuries, the ocular side was largely neglected. Some works of note appeared, but had little influence. The periodical eye inflammation, known as moon blindness, was the subject of papers by Ammon and Toggia in 1807 and

1819, while Leblanc in 1824 wrote a treatise on eye diseases, their prevention and treatment, in domestic animals. A work by Müller in 1847 showed no progress over earlier publications. Real progress dates from the early seventies of the last century, when Friedenberger and Bayer, but especially Rudolph, Berlin and Eversbusch, made lasting contributions to the subject. The two latter published a short lived journal, the *Zeitschrift für vergleichende Augenheilkunde*, which contained some publications of merit, and with the works of Möller and Bayer mark progress in this special line of work. Hirschberg's work on Comparative Ophthalmology and Dioptrics of Fish and Amphibian Eyes are part of the result of placing oculists on the staffs of institutions for the teaching of veterinarians. In 1910 the "Archives for Comparative Ophthalmology" was founded by Gustave Freitag.

M. W. J.

ABSTRACTS FROM FRENCH OPHTHALMIC LITERATURE.

BY

M. W. FREDERICK, M. D.,

SAN FRANCISCO.

JESSE S. WYLER, M. D.,

CINCINNATI.

War Injuries of the Orbitoocular Region.

DE LAPERSONNE, F., Paris (Blessures de guerre orbito-oculaires, *Arch. d'Ophthalmologie*, Vol. XXXIV, No. 8, January and February, 1915, p. 493), writes an article of such timely interest that it is given here almost in its entirety. The author has already treated eighty serious wounds of the orbito-ocular region, and because the findings did not agree with former teachings, he urges his colleagues to carefully note and collect all data concerning this class of wounds. The reason for this difference between past and present lies in the improvements in modern arms, the much greater velocity of bullets and artillery projectiles, and the modern methods of fighting.

The author recalls that wounds of the eye and orbit may be produced (1) by cylindroconical bullets that taper sharply and have a high projection force; (2) by spherical lead balls coming from shrapnell, whose projection is much less; (3) by the bursting of shells close by; (4) and by a large number of foreign bodies, powder, fragments of iron or copper, earth, pieces of glass and clothing, etc., driven into the tissue by the explosion of shells, shrapnell, or grenades.

The projectiles traverse the orbit either anteroposteriorly or transversely. In the former case they generally enter the cranial cavity, after bursting the eye, and produce encephalic lesions, which, however, are not always fatal. If the projectiles are nearly spent, or if they have ricocheted, they may come to rest in the orbit or its surroundings, whence they may be easily extracted. Such was the case in a clerk who received a Lebel bullet which had been intended for a taube.

The ball had lodged in the outer part of the orbit. A sclero-corneal suture was placed and the eye saved; the sight, however, was lost through a complete detachment of the retina.

Localization enables us to determine the seat of the projectile and to extract it without causing much destruction of tissue. In this way a German bullet which, after glancing off the external orbital margin, had turned around and buried itself under the malar bone, remaining entire, was outlined and easily extracted by the butt.

The transverse wounds of the orbit are in a class by themselves on account of the serious consequences. In the war of 1870-71 the Germans collected twenty-eight cases of this kind, in nine of which both eyes were immediately destroyed. We are already familiar with pistol shot wounds of this kind from criminal attacks and suicidal attempts. In the eighty cases collected during this war, fifteen were transverse wounds of the orbit, and in seven immediate bilateral blindness resulted. The results of these transverse wounds vary according to the obliquity of the path pursued by the projectile, and to the depth at which the projectiles traverse the orbit. In one case there will be bursting of both globes; in another bursting of one globe, and rupture of the choroid, intravitreal hemorrhage, and detachment of the retina in the other eye. If the bullet passes near the apex of the orbital pyramid, we have a large retroocular hemorrhage with motor and sensory paralyses, tearing or bruising of the optic nerve, etc.

Wounds from the bursting of shells are not as dangerous as far as the conservation of the eyes is concerned, as wounds from bullets. In recent wars only twenty-five to thirty-five per cent of the eyes wounded by bullets could be saved, whereas sixty to seventy per cent of the eyes injured by shells were conserved. De Lapersonne was not as fortunate with his fifty-nine cases, and even when he did save the globe the sight was much impaired. Just as deaths are reported from the bursting of shells which did not touch the person, so we have grave commotion of the eye from shells bursting near by. Detachment of the retina and retinal hemorrhages have been reported: temporary amblyopia with photophobia, tearing and blepharospasm are often seen, and which resemble the cases of ocular hysterotraumatism which are not uncommon in industrial accidents. These conditions are shortlived; a few days of rest, and tests of the vision to expose malingerers,

will put an end to them in a few days. There is this to be considered: that under the influence of this commotion even the slightest traumata, foreign bodies in the conjunctiva or cornea, have often more serious consequences, even though rigorous antisepsis be observed. In this regard we have a parallel to the injuries due to mine explosions. In another place the author has related severe cases of iridocyclitis brought on by very superficial injuries to the eyes of miners caught in explosions of fire damp.

Penetrating wounds of the orbit often give rise to traumatic cataract, and in these cases surgical intervention is to be strictly avoided, as it would bring on a severe plastic iridocyclitis. If the radiogram shows the presence of foreign bodies in the eye, an immediate enucleation should be resorted to. If the foreign body is magnetic and the wound fresh, one might try to extract it with the magnet; but the chances of obtaining a good result are far less than in the industrial accidents, as the wound is so often infected.

The most frequent accident is the rupture of the globe. In some cases there is a large starshaped opening in the cornea, sometimes a large rupture of the sclera, either in the anterior or posterior hemisphere. The detachment of the membranes is total, and the globe filled with a blood clot. Enucleation in these cases was done thirty times in the eighty cases, and in reality amounted to a trimming up of the stump. Lesions of the bony orbit and of the upper maxilla, with vast destruction of the soft parts, accompany these wounds and demand treatment at the same time. The orbital margins are often veritably pulverized, and the particles sometimes driven even into the globe. Fractures at base of the skull, injuries to the accessory sinuses of the nose, large defects in the upper maxilla, so that orbit, maxillary sinus and buccal cavity are all thrown into one cavity, occur. In one case the radiogram showed a large cubical piece of a shell which, ranging downwards through the frontal sinus, passed behind the globe, causing a detachment of the retina and a division of the optic nerve, and had lodged between the orbit and the maxillary sinus. In another case a shrapnell ball had passed through the orbit, rupturing the globe, and had lodged near the sphenoidal sinus level with the basilar apophysis, hardly raising the pharyngeal mucosa. As both these bodies are well tolerated, no attempt has been made so far to remove them.

In spite of the gravity of some of these wounds, when the patients recover from the shock the general health becomes excellent, and no deaths have so far occurred.

As to the treatment of these cases, the first thing to consider is the general condition. More than any other, the soldier who has been wounded in the ocular region reaches the hospital in a depressed, discouraged, somnolent state, and the first thing to do after cleansing the wound is to let him sleep. Antitetanus serum should be used in all cases, even in those where the wound seems insignificant, and a careful cleansing of the wound, the removal of all foreign bodies, and the parts washed with hydrogen peroxid, one part in four of water. As the conjunctival sac does not tolerate hydrogen peroxid, a saline solution containing fourteen grammes of salt to one thousand of water should be used. Compresses wet with permanganate of potassium, one-half in one thousand, are useful in the first days, but should be discarded as soon as the sloughs come away. Here, as in all war surgery, tincture of iodine gives excellent results, and should be applied every two or three days to the gray spots. Iodoform can be applied in powder, or in a ten per cent ointment, to the conjunctiva.

Early reunion should be prevented, although large flaps should be approximated. Especially in the wounds of the eyelids complicated with large hematomata, sutures should not be placed, as this leads often to abscess of the lid. Even in wounds of the lid margins it is better to wait a few days and then to freshen the edges. Corneal and scleral sutures find but little employment in these war injuries, in view of the severity of the injury, the infection, and the intraocular hemorrhage. Sewing the conjunctiva over corneal wounds is, as in ordinary eye surgery, of great value. Traumatic cataracts should be handled very gingerly, unless a condition of secondary glaucoma supervenes, in which case the removal of the lens by suction will offer the least offensive means.

Although sympathetic ophthalmia is not as frequent in its severe form as it formerly was, there exist a number of "attenuated sympathetic ophthalmia" cases, which are not as alarming in their incipency, but just as serious as to vision in their end results. But even in its severe form, sympathetic ophthalmia is not precocious, and has never been noted before the seventh or eighth day, so that immediate enucleation in

ambulances, etc., is not called for, and should not be practiced until the patient is suitably housed in a special hospital. It should be borne in mind that these enucleations are more difficult than those ordinarily performed, on account of the complications presented by the wounds of the surrounding tissues. The conjunctiva should never be sutured, and a drain should be left in for forty-eight hours to prevent the accumulation of blood in the orbital cavity. If the radiogram shows that there is no foreign body in the orbit, the healing is simple. The fitting of a prosthesis presents more than the ordinary difficulties, on account of the large amount of cicatricial contraction generally present. M. W. F.

The Abderhalden Reaction in Ocular Pathology.

FRENKEL, H., AND NICOLAS, E., Toulouse (Le réaction d'Abderhalden en pathologie oculaire, *Arch. d'Ophthalmologie*, Vol. XXXIV, January-February, 1915, p. 501), after reciting the negation of E. von Hippel of the results of Roemer and Gebb, in which he had the assistance of Abderhalden himself, and the contradictory findings of several other observers, give their own findings in forty cases, which were made up of twenty-seven cases of cataract, five of iritis, two of interstitial keratitis, two of ulcer with hypopyon, one of glaucoma, one of scleritis, one of floating vitreous opacities, one of specific ocular paralysis. In all these cases the reaction was negative, both by the chemical and the optical methods, with one exception, that of a senile cataract. M. W. F.

Cataract Extraction With a Small Loose Conjunctival Flap.

TRUC, H., Montpellier (L'extraction de la cataracte à petit lambeau conjonctival libre. *Révue Gen. d'Ophthalmologie*, Vol. XXXIV, No. 2, February, 1914, p. 49), after a long, rambling historical introduction, makes a plea for the use of the free conjunctival flap in cataract extraction, and condemns the use of the attached flap as being far more difficult to work under, while not producing any better results. He also considers the use of corneal stitches as superfluous when a flap is made. If a preliminary iridectomy is made, the flap at the time of the extraction is hard to make, unless one starts his iridectomy well within the limbus, or uses a very small conjunctival flap in connection with the iridectomy. M. W. F.

ABSTRACTS FROM SPANISH OPHTHALMIC LITERATURE.

BY

WILLIAM H. CRISP, M. D., OPH. D. (COLO.),

DENVER.

An Ophthalmia of Fishes in Aquariums.

MENACHO, ANTONIO (*Archivos de Oftalmologia*, July, 1914). The disease in question consists of an opacity of the cornea, purulent and fibrinous deposit in the anterior chamber, marked vascular injection of the bulbar conjunctiva, and extraordinary increase of the volume of the eyeball at the expense of the anterior chamber (anterior staphyloma). In the most serious cases death supervenes on the second or third day. In the cases in which life is preserved, perforation of the eye is frequent, from thinning and necrosis of the cornea. Cure occurs only in very mild cases.

Considerable regression of the symptoms may be obtained, and frequently the life of the fish may be saved, by puncturing the eye. The disease has been observed in *Serranus scriba*, *Sargus annularis*, *Scorpoena scrofa*, *Scorpoena porcus*, *Pagellus bogoraveo*, *Exocoetus rondeleti* and *Moena vulgaris*. Menacho attributes the condition to corneal traumatism, either from the wall of the aquarium or from other fishes, followed by infection by some diplobacilli and diplococci which he found in the pus. He was able to produce the disease by inoculation of traumatized eyes of *Serranus* and *Sargus* with these organisms.

Oxycephalic Optic Neuritis.

CARRERAS, B. (*Archivos de Oftalmologia*, July, 1914). The patient, a boy, was thirteen years old at the time of examination. He was the first of four children, none of the rest of whom showed any similar defect, and nothing of significance was obtained in the family history. The cranial deformity and the visual defect were noticed in the first years of life. The symptoms included, besides the tower skull, a slight de-

gree of exophthalmus, divergent strabismus, and oscillatory nystagmus. The ocular media were perfectly clear, and the pupils reacted to light, both directly and consensually. The discs presented the appearance of simple optic atrophy, with slight excavation. The retinal vessels were normal. The vision of the right eye was perception of movements of the hand at a half meter, and of the left eye movements at twenty centimeters.

A Case of Glioma of the Retina.

CAMISON, AGUSTIN (*Archivos de Oftalmologia*, July, 1914). The child was seen and the tumor removed at the age of three years. The condition had first been noticed by the parents four or five months earlier. There was extreme exophthalmus, and the cornea was on the point of perforating. The left eye was normal. There was no other case in the family.

Tuberculoma of the Choroid.

LEOZ ORTIN, G., Madrid (*Archivos de Oftalmologia*, July, 1914). A boy of four years was brought with the right eye distending the upper lid, and vision of the eye entirely lost. Closure of the palpebral fissure was almost impossible, and there was scarcely any movement of the eyeball. The enlargement of the eye was most pronounced in the upper outer equatorial region, where the sclerotic was almost destroyed. There had been several glaucomatous attacks. The retina was almost completely detached. Seven days later the sclera perforated, and the eyeball was enucleated. Histologic examination showed the growth to be an enormous solitary tuberculoma of the choroid, and several tubercle bacilli were found. The child was apparently in flourishing health, and had no discoverable lung or glandular lesion; and there was no history of tuberculosis in any of the relatives. More than a year after the operation the boy's health still seemed perfect.

Sympathetic Ophthalmia.

SANZ BLANCO (*Archivos de Oftalmologia*, October, 1914). Eleven cases are cited. Nine of these were in the incipient stage. In seven there was unquestionably serous iridocyclitis, and in the other two there were amblyopic disturbances, sensibility to light, reduction in accommodation, concentric nar-

rowing of the visual field, and occasional photopsias. In the two remaining cases the vision had been lost from iridochoroidal atrophy resulting from sympathetic uveitis. Ten of the patients had suffered traumatic lesions in the first eye. In the nontraumatic case the first eye had suffered from some diseased condition which had produced an extensive calcareous concretion involving the whole of the uveal tract and the lens. Of the ten traumatic cases, in eight the injury resulted from firearms, with retention of a foreign body within the eye. The other two traumatic cases, in both of which there was no foreign body within the eye, were the only two cases of the series in which the sympathetic phenomena were mild, and apparently not due to uveal inflammation. In all of the nine incipient cases, enucleation of the offending eye saved the second eye.

The intervals of time after the original injury at which symptoms suspicious of sympathetic disturbance appeared were: In one case twenty-six days, in one thirty-two days, in one sixty days, in one sixty-four days, and in the rest from two to four months (with the exception of the case of calcareous degeneration, in which the period could not be determined).

Two other cases are referred to as belonging to the class in which at first glance a sympathetic etiology might be assumed, but does not actually exist. In one of these cases the right eye had been punctured by the metallic tip of an umbrella, with rapidly resulting atrophy of the eyeball. About two months later, the patient, a man of twenty-two years, came complaining of visual disturbance, pain, photophobia, and lacrimation in the second eye. But the case proved to be one of syphilitic plastic iritis, and yielded to specific general combined with the usual local treatment.

The Present-Day Operation for Cataract.

SANTOS FERNANDEZ, J., Havana (*Archivos de Oftalmologia*, November, 1914). The question, "How ought we to operate for cataract in the present day?" is answered as follows: With rare exceptions, the operation should be by simple extraction. Discission should be done with the knife at the same time as the keratotomy, and the latter should be termi-

nated with a conjunctival flap, which in the author's opinion takes the place of a corneal suture. Whatever invests the operation with greater simplicity, signifies avoidance of traumatism and a guarantee of success.

Transparent Epicorneal Dysmorphia.

MENACHO, M., Barcelona (*Archivos de Oftalmologia*, November, 1914). A certain number of cases of keratitis heal without leaving a visible opacity of the cornea. By epicorneal dysmorphia Menacho understands the deformity of the epithelial layer of the cornea which is manifested solely by distortion of the keratoscopic image; thus excluding visible infiltrations. Negative data concerning former ocular affections, furnished by the patients, are not sufficient to deny the existence of such disturbances when keratotomy renders evident the deformity of the epicornea. Menacho maintains that this epicorneal dysmorphia is a cause of myopia.

Condyloma of the Iris.

SANTOS FERNANDEZ, J., Havana (*Anales de Oftalmologia*, October, 1914). Nineteen personal cases of this condition are briefly described. As regards location, the upper part of the anterior surface of the iris was occupied three times, the major vascular circle of the iris four, and the pupillary and ciliary borders of the iris at the same time once; and the growth was situated between the pupillary and ciliary borders of the iris five times. All the writer's cases were in men. In this connection he remarks that of nine hundred and seventy-eight cases of syphilitic iritis seen in the Havana eye clinic in the course of thirty-nine years, eight hundred and sixty-five were in men, and only one hundred and thirteen in women. He attributes this difference as regards the sexes to the fact that in Cuba immigration is confined to men, and that women expose themselves less than men to syphilis.

As regards age, five were twenty-three years of age, four twenty-four, twenty forty, and one each twenty, twenty-one, twenty-two, twenty-five, twenty-seven, twenty-eight, thirty, thirty-two, and forty-one. In four cases the patient did not know that he had contracted syphilis, not having observed the chancre. In one patient the condyloma appeared one

month after the chancre, in one two months after, and in others respectively two, four, and twelve months after. In one eighteen months had elapsed, in others two, three, and four years respectively.

Toti's Operation and West's Operation.

CAMPOS, E., Rio de Janeiro (*Anales de Oftalmologia*, November, 1914). In a case of lacrimal obstruction with chronic suppuration, Toti's operation of dacryocystorhinostomy gave permanently perfect drainage, liquid injected into the canaliculi passing easily into the nose. In a case of similar character in which West's operation of endonasal opening of the lacrimal sac was done, the cure was equally effective. Either operation is indicated in cases in which complete closure of the canal renders catheterization impossible, or in old cases in which there is no hope of relief from conservative treatment. Both the patients whose cases are described felt an escape of air from the nose at the inner canthus, but there was no regurgitation of secretion.

Failure to obtain results from Toti's operation in two other cases briefly referred to is attributed, in one to inexperience with the operation, and in the other to postoperative suppuration and the probable existence of tuberculosis of the sac.

Dacryocystorhinostomy by Toti's Procedure.

RUEBRECHT, Bruges, Belgium (*Anales de Oftalmologia*, December, 1914). A case was shown in which chronic dacryocystitis had been treated on one side by dacryocystorhinostomy according to Toti, and on the other by the ordinary operation of extirpation of the lacrimal sac. The advantage was with the former operation. Toti's operation has been done by the writer in fourteen cases. Six of these were done before the technic was fully known, and the results were imperfect. In the other eight cases Toti's own technic was closely followed. In one case the operation was a complete failure. In two there was facial paralysis, and the lacrimation persisted. One of these two cases, however, illustrated the curative value of Toti's operation, in that an external fistula which had complicated the patient's dacryocystitis was entirely closed without further treatment, within nine days after the operation.

In the remaining five cases the result was perfect. The operation, correctly performed, is regarded by the author as producing better results than extirpation of the sac, and he also prefers it to that of West.

Six Cases of Visual Perturbation From Observing a Solar Eclipse.

SANTOS FERNANDEZ, J., Havana (*Cronica Medico-Quirurgica de la Habana*, January, 1915). Six cases observed in connection with the solar eclipse seen in Havana in 1878 are recorded. In all of them the disturbances were limited to marked overstimulation of the retina, manifested by photopsias. In no case was there a distinct lesion at the macula.

ABSTRACTS FROM ITALIAN OPHTHALMIC LITERATURE.

BY

J. HERBERT CLAIBORNE, M. D.,

NEW YORK.

The Bacterial Flora of the Conjunctiva Before and After the Operation of Dacriocystostomia.

FAVA, ATTILIO (*R. Clinica Oculistica di Roma* (Prof. Cirincione) for October, November and December). The paper is a continuation of a preceding one, and deals with the examination of the conjunctiva before and after the operation of dacriocystostomia. The microorganisms isolated were both aerobic and anaerobic. The paper is filled with minutiae, the method of examination and a description of the cases. The results are tabulated, and after a prolonged discussion of the subject the following conclusions are drawn:

1. The bacterial flora of the conjunctiva during pathologic processes in the lacrimal ducts consists ordinarily of aerobic microbes, of which the most frequent and important is the diplococcus of Fränkel, alone or associated with other bacteria; to this fact principally the infectious character of the lacrimal secretion may be ascribed. In the order of frequency come the bacillus of xerosis, which never have any pathologic action, and the staphylococcus. Rarely are anaerobic germs and other accidental microbes met.

2. The operation perceptibly reduces the number of microorganisms in the conjunctival sac. As opposed to one thousand and ninety-nine colonies with four cases of confluent culture of the diplococcus of Fränkel before the operation, there were three hundred and sixteen colonies with five cases of negative cultures from eight to ninety days afterwards.

3. The microorganisms most frequently met after the operation are the bacillus xerosis and the staphylococcus albus; anaerobic microbes are never met. While after all of the

operations on the lacrimal ducts pathogenic germs are still found in the conjunctival sac, amongst them the diplococcus of Fränkel, after the operation of dacriorinostomia no virulent germs were found, nor the diplococcus of Fränkel either. The appearance, therefore, of the contents of the conjunctiva after this operation may be likened to that of the bacterial flora found in the normal conjunctiva and healthy lacrimal ducts. The most propitious moment for operations on the eyeball is about thirty days after this operation, during which time the conjunctiva regains the normal condition.

The operation of dacriorinostomia has been described antecedently in the *ANNALS*, and the conclusions drawn have a very decided bearing upon the time when it is best to operate for cataract after the removal of the lacrimal sac. I question whether this operation of dacriorinostomia has been done outside of Italy, but it is so simple, as described, that it is regrettable it is not tried elsewhere. It consists, in a few words, of making an opening through the nasal process of the superior maxillary bone—thus connecting the lacrimal sac with the interior of the nose. This operation avoids a scar which persists after the operation of removal of the sac. The innocuousness of the xerosis bacillus and the period of time which is necessary for the conjunctival sac to become normal are the two most important conclusions to be drawn from this study. It is to be hoped that American surgeons will perform this operation, and if it is as effective as the removal of the sac, it will score an advance in cosmetic and utilitarian surgery.

The Passage of Antibodies Into the Intraocular Fluids in Normal and Pathologic Conditions of the Eye.

LAGANA, GIOVANNI (*R. Clinica Oculistica di Roma* (Prof. Cirincione) for October, November and December). This paper is a continuation of an antecedent one, likewise, and consists of a number of experiments on rabbits to determine the immunity of the aqueous and vitreous of the eye; likewise the method of passage of the antibodies into the ocular fluids. The paper, like most experimental ones, is incapable of being well epitomized. It, likewise, abounds in numerous terms relating to immunization, but the author has drawn some broad conclusions by which we may profit:

1. Antibodies pass from the blood into the aqueous and vitreous humors of eyes, which are not irritated, only in small quantities; perhaps there may be traces which cannot be observed by the means of observation at our disposal. A special power of selection must not always be attributed to the ciliary epithelium, but the absence of antibodies may rather be attributed to a low grade of immunity of the blood or to a less delicate faculty of reaction.

2. All the causes that affect the eye, whether physical, chemical or bacterial, show an increase in passage of immune antibodies, which degree is relative to the amount of irritation, and, therefore, they can be classified in the order of their importance—bacterial inflammations holding the first place, and then that caused by turpentine, the sodium salts, paracentesis and, finally, subconjunctival injections of the chlorid of sodium. The author is inclined to believe that the observations of Tchirkovsky, who found a larger quantity of antibodies in the aqueous of eyes operated on by iridectomy and for cataract, are not exactly correct. He was not able to investigate this point in eyes operated on for cataract, because the animals selected for the experiments died during the period of immunization.

3. The constant conclusion from all his experiments is that the vitreous humor participates in immunity less than the aqueous.

He makes the query, "Why in the intraocular fluids of an eye, not irritated, are immune bodies found in a lower percentage than in the blood?" All the causes which increase the amount of albumin in the blood produce an increase in antibodies in the anterior chamber and the vitreous body. As we know, subconjunctival injections of NaCl slightly increase the amount of albumin for a period of two hours. The author likewise has demonstrated, as shown, that there is a passage of antibodies within the first two hours. After four or five hours this is diminished. The regenerated aqueous is rich in albumin and has the tendency to coagulate of itself.

For this reason the percentage of antibodies is shown to be increased in the first six hours after paracentesis. In fact, if the irritation to the eye is such as to cause an alteration in the internal membranes, the intraocular fluids lose their

physico-chemical character to acquire that of an exudate, and therefore are still more rich in albumin. The more intense the inflammation the greater are they modified, and the more marked is their immune power. It is less easy to explain the well known fact of fewer antibodies being in the vitreous than in the aqueous. If the physico-chemical character of these two fluids are almost equal, why are their degrees of immunity so different? The author thinks that this question cannot be answered at this time with any degree of certainty.

For therapeutic success in diseases of the eye (for which we possess a specific serum) it is not necessary for the antibodies to pass into the intraocular fluids. The seat of all changes are the membranes, which are furnished with blood vessels that guarantee the entrance of the agents used into the eye. Upon this line of research we may base one of the most beautiful hopes of ophthalmology, because the study of the antibodies in the intraocular fluid is linked, as shown above, with that of proteid substances, and inasmuch as metabolism is concerned almost entirely with these, there is no risk in assuming that when biologic reactions have been rendered more refined, we may be able to arrive at a broader and deeper knowledge of the nutritive phenomena of the eye.

Investigations of this type, as carried on at the University of Rome, in the clinic of Professor Cirincione, are commendable and admirable. It is regrettable that in our clinics in America there is no regulated system of laboratory research. It would be indeed conducive to the glory of ophthalmologic and surgical science in general, and especially to that of American surgery.

SOCIETY PROCEEDINGS.

BY

ARTHUR J. BEDELL, M. D.,

ALBANY.

CHICAGO OPHTHALMOLOGICAL SOCIETY.

Meeting held December 14, 1914. Dr. Wesley Hamilton Peck, the president, in the chair.

Short Period of Healing After an Intracapsular Cataract Extraction.

Dr. John R. Hoffman presented a case which showed the invariable short period of healing after an intracapsular cataract extraction. He operated on the patient, Dr. B., on the fourth instant, this being the eleventh day. A preliminary iridectomy had been done some months previously, but because of unavoidable delays the extraction was not done as early as contemplated.

In the operation he followed the technic as described by Dr. Vail, of Cincinnati, with the modifications and instruments devised and used by Dr. William A. Fisher, with the departure from the latter in so far that the spring speculum was used while making the incision. The author had made it a rule to use the retractor in this step of the operation. The reason for the departure at this time was the fact that the patient did not stand the retractor well. It was tried several times after recocainizing the eyes before proceeding with the operation, but the patient exhibited a great deal of uneasiness every time. On trying the speculum, however, the irritation was not so severe and patient was quiet. After making the incision after the method of Smith, the speculum was replaced

by the Fisher lid hook, and the author proceeded to deliver the lens according to the procedure described for the tumbler class, as the lens appeared to be of the intumescent variety which readily tumbled. Placing the point of the extracting hook over the border of the lens, and making pressure directly downward towards the feet, the capsule readily gave way below, and the lower edge of the lens presented in the wound first, making the delivery practically free from danger of loss of vitreous, as the upper part of the capsule was ruptured in this case after the lens was out of the wound, and the eye being turned up, there was no pressure exerted on that medium. After making the usual toilet of the wound, which consisted in replacing the pillars of the iris coloboma with the iris repositor, both eyes were dressed with yellow oxid of mercury ointment over the palpebral fissures and gauze pads and the patient was put to bed.

The patient exhibited no discomfort during his period of confinement to bed for the usual nine days.

The dressing was not disturbed until the ninth day, when on removing it the wound was found healed, and the eye presented none of the irritable conditions present in a large number of cases after the extracapsular operation. Examination of the media showed everything clear, and vision without a lens was fingers at six feet; with a plus 10.00, it was 20/30. The case was typical of the healing in successful intracapsular operations.

The author was convinced from the moderate experience he had had with the operation that any one who had had experience with the older methods of extraction, and desired to do it, would be successful if he followed the technic of Vail and Fisher, with an assistant who would study carefully the method of holding the lid hook.

Discussion.—Dr. William A. Fisher stated that the corneal wound had healed and the patient had recovered from the operation without the slightest irritation or inflammation. The eyes were bandaged for nine days after the operation, and tonight, eleven days after the operation, the patient seemed to be in a condition to be discharged. The fundus could be seen with the ophthalmoscope, and there was no capsule to interfere with his vision or cause him to return for a secondary operation. Patient's vision was 20/40 with correction, and it

was fair to presume that he would have 20/20 within the next two weeks.

Many operators would be glad to adopt the intracapsular operation as a method of choice, provided they could safely perform it. He was pleased to know that Doctors Hoffman, Tydings, Gradle and Suker were doing the intracapsular operation, and he believed many more would be doing it in a short time, provided the technic was mastered while doing the old operation.

To remove a lens in its capsule required a perfect technic, and it could be mastered by good operators, provided they adhered strictly to the Smith teaching. More losses of vitreous would occur to anyone beginning the new operation, but the absence of postoperative inflammation would more than counterbalance the trouble caused by a slight loss of vitreous. Both eyes should be kept bandaged for nine days after the operation, whether the lens had been removed in its capsule or the needle had been used. In thirty consecutive operations, postoperative inflammation followed only in one case, and that was one that had a prolapsed iris which recovered with 20/20 vision. He did not recommend his needle except in cases where safe pressure had been used and the lens would not move. The more expert one became the less often would he be called upon to use the needle.

Typical Albuminuric Retinitis Fundus With Negative Findings.

Dr. Michael Goldenburg presented a patient, H. W., aged thirty-seven years, coppersmith helper, who came into the clinic with the history of his sight becoming hazy in the left eye. Vision in the right eye had always been bad, and when hunting, patient was compelled to use his left eye. Vision at this time was 10/200 in each eye. Pupils were dilated with homatropin and fundi examined. The right was found to be negative and with a high degree of hyperopia.

In the left the author found a marked neuroretinitis with many hemorrhages which were limited to the circumference of about two papillary diameters of the disc. The peripheral part of the fundus was free of hemorrhages; the vessels were tortuous and the veins dilated, resembling to a marked extent a mild form of thrombus of the central retinal vein. Eight days later, when the fundus was examined again, most of the

hemorrhages were absorbed, with a beautiful stellate glistening white deposit in the macular region, a typical picture of albuminuric retinitis.

Refraction:

O. D., 10/200 + 6.00 \odot + 1.50 ax. $90^\circ = 20/100$.

O. S., 10/200 + .75 \odot + .50 ax. $90^\circ = 20/100$.

Wassermann negative.

Urinalysis was made five times and all were negative in every respect. A twenty-four hour specimen was used. The average specific gravity was 1020.

The ethmoids and sphenoids manifested nothing upon inspection or X-ray plate. Blood pressure, one hundred and twenty-five; heart negative; fields contracted and no central scotoma for red or green; as to the brain, there were no signs or symptoms that would suggest a brain tumor. General physical condition of patient good.

Discussion.—Dr. Clark W. Hawley thought that the case reported by Dr. Goldenburg was similar to two cases that he reported to the society some time ago. The description about the macula of Dr. Goldenburg's case was typical of the effect due to some toxemia. The stellate appearance of the exudate about the macula, according to the description, was exactly the appearance about the macula of the speaker's two cases. The cause of the condition in his two cases was due to toxemia from the lower bowel. In both cases the exudate about the macula disappeared.

Some Experiences With the Intranasal Partial Resection of the Tear Sac.

Dr. J. Sheldon Clark, Freeport, Illinois, read a paper on this subject, in which he summarized as follows:

What was to be expected from resection of the tear sac intranasally? 1. A functioning tear apparatus was the foremost attainment. 2. There was no possibility of an external scar, nor did the patient or the doctor have a dread that there would be a resultant scar. 3. There was no epiphora following the operation. 4. There was no possibility of having to do a secondary operation upon the lacrimal gland on account of the troublesome epiphora. 5. Epiphora due to stenosis was readily cured by this procedure. 6. No other procedure would admit of trial in the presence of phlegmon. With the

intranasal operation one might operate where there was phlegmon without fear, and successfully. 7. A patient with tear sac trouble was very much more apt to accept the intranasal route than he was the external operation for the total excision of the sac.

Discussion.—Dr. H. W. Woodruff, of Joliet, Illinois, had seen the results in two cases operated on by this method, and said they were good in both. The first one was operated by Dr. Clark at the eye and ear infirmary last June, and the other one was shown here by Dr. Brawley one month ago. Whether this operation or other intranasal operations on the tear sac would entirely supersede the extirpation of the sac externally was doubtful.

It would probably be contraindicated in dacryocystitis with cataract as a prophylactic measure before the cataract extraction. The extirpation would be more certain of removing a dangerous infective focus. It would be an ideal operation, however, in certain cases of epiphora with stricture, but without dacryocystitis. Such cases, for instance, which had been repeatedly probed without benefit and in which the eyes were constantly suffused with tears, would be greatly benefited by this operation. He would like to see this operation tried on such cases.

Dr. F. C. Todd, of Minneapolis, said he had not as yet performed the West operation, and he was waiting until he could see it demonstrated by Dr. Clark, who had accepted an invitation to come to Minneapolis next month. The operation appealed to him as a rational procedure in cases where it was indicated. He intended to give it a fair trial. He would be disappointed if it did not meet his expectations, as it seemed in many respects preferable to older forms of treatment. It was distinctly an operation for the rhinologist.

Dr. Richard J. Tivnen stated that the procedures at present in vogue for the relief of chronic interference with the drainage of the tear sac and its associated disturbances were far from perfect or satisfactory. The plan of the intranasal operation described by Dr. Clark, which had as its basic idea the short circuiting of the duct, with the end in view of providing a functioning tear apparatus, appeared sound and scientific. The chief advantages it offered were the preserv-

ing of a drainage outlet, the avoidance of a scar externally, and its almost universal availability.

As to septal deflections, particularly those situated superiorly in the nasal fossæ, they usually demanded operative correction before the operation on the duct could be successfully conducted. Since such deflections were commonly met with, this additional requisite operative interference might militate against the popularity of the procedure.

He should be glad to know from Dr. Clark what the real practical technical difficulties of the operation were.

Dr. Frank Brawley wished to ask Dr. Clark to give the after-treatment more in detail. In the case operated by Dr. Brawley and presented at the November meeting, there had been some trouble with granulations covering the bone wound, and these had been controlled with silver nitrate fused on a probe. To date this case had shown no further evidences of pus, fluids could be syringed into the nose easily and the fluorescin test was positive, though requiring several minutes.

Dr. J. A. Pratt, Aurora, Illinois, heartily endorsed the intranasal drainage of the lacrimal sac. Although both times he was in Vienna he took the operative work of the excision of the lacrimal sac under Dr. Meller, he had never practiced the operation for the ultimate result of the continual toilet of the eye, and the lack of drainage of the conjunctival sac never appealed to him, and he had relied upon dilatation and the style.

Three weeks ago he did the West operation on a patient who had had unsatisfactory results with a scar, with the most happy results. The patient now was entirely free of her trouble. The operation was performed as Dr. Clark had described up to the point of opening the sac, when he found he could not grasp the sac with the West forceps. He had the assistant push out the sac with the probe as directed, and then he curetted through the sac with a small sharp probe as directed.

In his opinion, when we had established this short route drainage into the nose, we would cure nearly all the ills of the lacrimal sac.

Dr. R. H. Good expressed the opinion that in the near future most diseases of the lacrimal sac requiring surgery would be operated intranasally. He objected to the term resection

of the sac, because it was misleading, in that it left the impression that the entire sac was resected. In reality it amounted to simply slitting the sac.

In regard to the employment of morphin before operating on the nose and throat, he had abandoned this some years ago, on account of the fact that the patient might have a severe hemorrhage after being placed in bed and, being in a drowsy condition, swallow the blood without the nurse or the patient knowing that it was a hemorrhage.

Dr. Yankum had brought out the point that many of the tear sac troubles were due to the closure of the nasal duct on account of the bony foramen being too small. By removing the nasal bony wall of this foramen and slitting the duct all the way up into the sac, it had given good results without the more radical procedure of resecting a part of the sac.

The use of the bur for the West operation accomplished the same results, and could be much quicker and more easily performed.

Dr. Clark, in closing the discussion, stated that the operation was of the greatest value in dacryocystitis as a preliminary to cataract extraction, as well as in the other conditions named in the paper. In fact, this was one of the conditions best suited to the intranasal procedure.

As to the details of the after-treatment, there was nothing particularly different to add from what was given in the paper. Excessive granulations should be combated here as in other nasal work.

The operation was not so highly technical, and yet it was one which should only be done by those who are accustomed to working high up in the nose. As in some other nasal operations, one should be able to "see with his fingers" as well as by the aid of direct vision. He spoke of the possibility, in some instances, of having to do more than the simple work on the floor of the sac. Occasionally a high submucous partial resection of the septum would have to be made, and the pyriform process and the anterior end of the middle turbinate would have to be resected.

As to its applicability in so-called hernias of the sac, in all this work it was simply a question of drainage, and once this was established and maintained, it was like it was in other situations in the body, in that healing took place. One of the

points made was that this operation was indicated in the presence of phlegmon, or where the process had extended beyond the sac.

The Localization of Foreign Bodies in the Eye.

Dr. Hollis E. Potter stated that steel, iron, iron rust, copper, brass, cement, stone, glass and wood were the most common bodies met with. Of these, wood was invisible unless painted. Glass, stone and cement were of medium density, but were visible in any appreciable quantity. The heavy metals were easily demonstrated.

Magnetic bodies, such as iron and steel, were not infrequently shown by X-rays when negative to the magnet test. When removed by magnets, a previous knowledge of the position permitted an extraction with minimum laceration.

When sclerotomy was necessary before the extraction, accurate localization was of prime importance. The present-day atrophy was sufficient as a guide for sclerotomy.

Simple plates were useless for accurate or even approximate localization. Some mechanical system must be adopted. The system as devised and perfected by Sweet was most accurate and easily used. One who did this work should localize every case he could so as to become proficient and uniformly dependable.

The author demonstrated two of the latest types of Sweet's localization apparatus. He also demonstrated several plates, lantern slides and charts.

Discussion.—Dr. Richard J. Tivnen stated that the value of the X-ray as an aid in diagnosis of foreign bodies involving the ocular structure was well recognized. The radiologist had perfected his technic and overcome the difficulties of localization of the foreign body to such a degree that it was now possible for the ophthalmologist to look forward with confidence in such cases for exceedingly valuable assistance from this source. The painstaking and instructive presentation of the subject by Dr. Potter deserved commendation and support.

He thought all ophthalmologists had reached the conclusion that skiagraphs of the eye, in so far as the diagnosis and localization of foreign bodies were concerned, belonged to the

domain of radiology quite apart from the rest of the science, and that men who became competent in this branch of the subject should be recognized as specialists in this particular field of radiology. This being true, it would seem the part of wisdom for the ophthalmologist to support in a practical way those men who are willing to specialize in this subject and who were willing to cooperate with ophthalmologists in solving the problems which this class of cases presented.

It had been his experience that one skiagraph was oftentimes insufficient to establish a positive diagnosis, and in all doubtful cases he insisted upon at least two. Numerous experiences had shown the utter unreliability of accepting as conclusive either the statements of the patient, the presence or absence of a wound of entrance, the negative response of the magnet and even the negative X-ray plate. The average case, however, would be discovered by an exhaustive interrogation of these several clinical evidences.

In all suspected foreign body cases he had come to follow as a routine procedure: first, obtaining a complete history of the accident, with especial reference to accounting for the foreign body; second, making a thorough examination, including the visual acuity, tension, fundus, etc.; third, making skiagraphs, two or more, in doubtful cases, and fourth, applying the electric magnet.

The surgeon should learn to interpret the skiagraph himself, as such a study would well repay the effort expended.

Regular meeting, held February 15, 1915. Dr. Richard J. Tivnen, the President, in the chair.

New Speculums for Operations on the Lacrimal Sac.

Dr. Clark W. Hawley presented a new speculum of his own design which gave more room during operation.

Dr. D. T. Vail, Cincinnati, exhibited a speculum he had designed which is suitable for the Axenfeld operation where the incision is made boldly down on the bone, showing the lacrimal sac alongside the nose through the periosteum, making a mastoid incision down on the bone, and with periosteotome stripping off the periosteum toward the lacrimal sac until the periosteotome drops into the lacrimal fossa. The instrument has been in use five years, during which time he has employed

it a number of times and finds it indispensable. With this speculum one can not only see the depths of the wound and lacrimal groove, but it controls hemorrhage. Hemorrhage, which has been quite an annoying feature in the extirpation of the lacrimal sac operation, is in this operation of no consequence.

Aqueoplasty, or the Zorab Operation for Glaucoma.

Dr. Casey A. Wood stated that about four years ago Mr. Arthur Zorab, of Southampton, England, conceived a plan to insure effective and continued drainage of the anterior chamber by inserting a loop of silk into it, bringing the cut ends through a scleral or sclerocorneal opening and imbedding the threads beneath the conjunctiva. In that situation they probably act as a sort of scleral seton.

He had an opportunity of seeing in Oxford, last year, several cases operated on by Mr. Zorab, and hearing them discussed by members of the Ophthalmological Congress.

The length of time that had elapsed since operation in these patients varied from three years to three months. In every instance the tension of the eyes operated on, the central and peripheral vision, and the progress of the case appeared to be entirely satisfactory. Each patient stated that his eyes had, since the operation, been free of irritative symptoms, and that the vision had either improved or had been no worse.

While the cases so far reported are numerically insufficient to make a profitable comparison of the merits of this procedure with the Elliot, Lagrange or other operations, the status of which is now definitely known, yet the experience of Zorab, as well as the character of the operation, appealed to him sufficiently to induce him to attempt it in three cases of absolute glaucoma—in eyes which, of course, were blind.

Dr. Wood then detailed the histories of two cases which he exhibited before the society.

The mydriatic which, following Edward Jackson's suggestion, the writer sometimes uses for diagnostic purposes in doubtful forms of glaucoma, in half an hour raised the tension in both eyes to quite $+2$. It fell to nearly normal under the influence of massage and eserine ointment. On December 17, 1914, a Zorab operation was done on the left eye and an Elliot trephining operation on the right. Healing proceeded without

incident in both eyes, except that quite recently the patient has had a conjunctival infection of the left eye. When she was last seen this had practically disappeared. Upon that occasion the tension in both eyes was normal and, most satisfactory of all, the central vision of the poor eye had improved to 20/200 and Jaeger 12; in the left eye vision had risen to 20/25 and Jaeger 1. There is a small hernia of the iris in the right eye, a circumstance which may be regarded as rather helpful than otherwise to a continued decrease of vision. The edema of filtration areas in all four eyes seemed satisfactory.

The operation of aqueoplasty, as performed by Zorab, consists in making, preferably at the insertion of the superior rectus, a sort of preliminary tunnel beneath the conjunctiva to the sclerocorneal margin, somewhat like the preparatory flap in the Lagrange or Elliot operation. A keratome is then passed into the anterior chamber and slowly withdrawn. A loop of wet, sterile, number 1, braided white silk thread, about half an inch long, is then introduced, by means of a special modified iris forceps, into the chamber through this opening. Careful withdrawal of the forceps leaves the loop of silk plainly lying on and extending half way over the iris of the medium sized pupil. The margins of the conjunctival wound are then stitched together.

The only modification the writer has to suggest in the technic of this operation is, perhaps, of some importance, because it lessens the difficulty of introducing the loop of silk. Instead of cutting the suture of the length that is to be preserved in situ, the suggestion is to make the silk ends quite long, that the loop be first introduced and the suture cut off to the required length just before the conjunctival wound is stitched. While the introduction of the silk is quite easy, the subsequent withdrawal of the forceps without disturbing the position of the loop is not always readily accomplished.

Once properly carried out, the procedure is not followed immediately or, as far as observed, later, by irritative symptoms or by inflammatory reaction. The healing takes place quite readily, and the effect upon the tension of the eye continues to be quite marked.

The writer is not yet in a position to advise this operation in cases where the eyesight of the patient is at stake. It is for this reason that he has so far confined aqueoplasty to practically blind eyes.

Discussion.—Dr. Edward Jackson, Denver, Colorado, stated that a slight modification of the operation under discussion was also proposed by Stephen Mayou, who suggested putting a knot on his thread to keep it from slipping into the anterior chamber, and before that, as he recalled, something of the kind had been done by Rollet for corneal suppuration. He supplemented that by introducing a thread into the anterior chamber, and did the same operation as a temporary measure for acute glaucoma; but with all these different propositions the operation seems to the speaker to be very much of an experiment, and one that he would not care to repeat. The greatest difficulty with all attempts to leave a permanent opening in the sclera has been a tendency in some cases for it to close. He has seen cases that have behaved nicely. The first case he operated on (Elliot operation) he saw a few months thereafter, and the result was satisfactory. In the other cases there seemed to be a very strong tendency for the scleral opening to close or to become so overloaded with new-formed connective tissue that it no longer served the purpose of drainage; it would be flooded in that position, and there would be a tendency to aggravate the irritation, increase the amount of new tissue thrown out, and in that way lessen the permanence of the result.

Dr. Derrick T. Vail, Cincinnati, reported a case of retained silk thread drainage from the vitreous chamber to Tenon's lymph channel for the relief of glaucoma.

Mr. F. J. R., aged seventy-five years, consulted him on June 17, 1907, on account of blindness and pain in his right eye. The history in brief was that three months before, he was seized with severe pain and inflammation of his right eye, soon followed by total blindness. One month before the speaker saw him he called on another physician, who diagnosed glaucoma and advised enucleation. Pupil was dilated and irregular from posterior synechia. There was deep ciliary injection from fulminating glaucoma. The anterior chamber was partly filled with blood, and the posterior surface of the cornea showed blood stains. Vision, nil. Tension, + 3; glaucoma absolute. Three days later Dr. Vail applied an antiseptic silk thread seton to drain the eyeball in the equatorial region. The idea was to stimulate a permanent posterior sclerotomy or to afford a permanent drainage from the vitreous chamber to

the space enclosed by the capsule of Tenon. The operation was very simple: a full curved, sharp, short and broad needle armed with No. 10 black silk plaited thread on the whipcord order, was passed through the conjunctiva in the equatorial region of the eyeball in the lower outer aspect of the globe, made to pass a short distance (about ten millimeters) under the episcleral tissues, then boldly through the sclera in the region of the ora serrata through scleræ, choroid and retina quite well into the vitreous chamber, and then passing out again through these tissues to emerge so that the space between the scleral openings was about eight millimeters in length. The needle was then introduced through the emergent conjunctival opening and allowed to glide backward under the episcleral tissues for a distance of about ten millimeters before final emergence. The thread was drawn so that the end just disappeared in the entrance of the conjunctiva and clipped so that the other end disappeared in the place of final emergence, and this loop of coarse thread, with its two ends leading from the vitreous chamber into Tenon's space, was left to drain the hydrops of the vitreous if it would do so.

There was little or no reaction from the operation itself, and no evidence of hemorrhage. The tension was relieved at once and remained so. All signs of redness disappeared in a short while, and the hyperemia likewise disappeared. He watched the eye for three months, when, finding the result permanent, and desiring to get rid of that thread which he feared to allow to remain with the patient away from his observation, he decided to remove it. This he did on September 19, 1907, three months after its insertion. He next saw the patient April 16, 1908, ten months after the operation. The note in his case book was short and convincing: "Tension normal."

He has never repeated the operation, for he confessed he feared it might be considered dangerous practice, for such a thing as leaving a permanent stitch in the eyeball was unheard of at that time; but now that the measure is recognized as being valuable and safe, he feels that his experience is worthy of bringing to the attention of the members. He called attention particularly to the greater advantage to the patient in having the drainage leading into Tenon's capsule, where there exists a large anatomic reservoir with backward flow of lymph, as compared with the thin conjunctiva near the cornea, poorly

supplied with efferent lymph channels of any size in comparison, and to point out the element of safety in postoperative infection as compared with subconjunctival drainage at the limbus.

Dr. C. B. Welton, Peoria, asked Dr. Wood whether in any of the cases he had observed or had seen reported, the piece of silk remained in position, or whether in any case it became free in the anterior chamber. He also asked in regard to the method of anesthesia.

Dr. Lee W. Dean, Iowa City, stated that some eighteen years ago Fuchs produced dilatation of the pupil to test for chronic glaucoma, and in the last eighteen months he had had one case in which he suspected glaucoma, dilated the pupil with euphthalmin and homatropin, without any increase of tension, and several months later operated for acute glaucoma.

Dr. Derrick T. Vail spoke of euphthalmin, and stated he saw it used fifteen years ago by Herman Knapp of New York. He did not know then why Knapp suspected glaucoma, but after the use of euphthalmin the disease was evident. Since then the speaker had used this mydriatic as a diagnostic measure in ophthalmic disease.

Dr. H. W. Woodruff, Joliet, pointed out that iridectomies in cases of glaucoma were sometimes said to be more efficacious if some of the iris was left in the wound. In fact, the iris was sometimes drawn up and left in the wound purposely to promote drainage. It would seem to him that if that operation was justifiable, certainly placing a thread in the anterior chamber was even more so.

Dr. Harry S. Gradle stated that Alt two years ago showed sections of eyes that were dilated by his method and the Elliot trephining method. The operation was successful where the eye was removed at autopsy, and unsuccessful where the eye was removed with increased tension. He proved conclusively that the beneficial effects of the trephining operation were due to the ingrowth of pigment epithelium into the lips of the wound; that the fistula was kept open by the pigment epithelium and not by the effects of the aqueous alone, consequently this fistula was always a menace to the patient. As long as there was filtration of the aqueous humor the patient was exposed to the danger of a low infection. Mueller's statistics, taken from three hundred and sixty cases, showed

two per cent infections occurring within two years after operation. Perhaps the percentage would increase as the number of years during which the operation would be done increase. He did not know whether the objection would hold in the Zorab operation or not, but the objection raised to iridectomy was a blotting out of the visual field for some unknown reason. The same thing happened after trephining. He had had this happen in three cases. The filtration operation should be attempted first.

Dr. Wood, in closing, said he had never seen the stitch move from its primary position. Patients were liable to have infection following both the Lagrange and Alt operations. Euphthalmin was not original with him. The ophthalmologist should not fail to use such a valuable means of diagnosis in doubtful cases.

Dr. William H. Wilder said the profession was indebted to Dr. Edward Jackson for the method of determining whether or not glaucoma would develop in doubtful cases. He himself had used the method for many years. There were some eyes, however, that would become glaucomatous on the slightest provocation, while with other eyes the ophthalmologist could do what he pleased with them and they would never become glaucomatous.

Coloboma of the Lens.

Dr. William E. Gamble presented the case simply on account of its rarity.

Tumor of Pituitary Body.

Dr. George F. Suker called attention to three cases which the members saw last year. After a prolonged study of the case of a young man upon whom he operated, he had come to the final conclusion it was a diploic dermoid.

The other two were pituitary cases—one in a young girl, and the other in a woman of thirty-five years. Both were still alive. One of them had improved very much. In the case of the young girl he desired suggestion and advice in regard to getting rid of a cerebral hernia which the patient now has. In the woman of thirty-five the X-ray plates showed a decided increase in the pituitary body and the sella turcica. In the right eye vision was 20/20 in the direct axial line. She had bitemporal hemianopsia. She was operated on the 16th of January of this year. Between the 16th of January and the 8th of February he found the field had increased in the right

eye, but she had only light perception. There was choked disc of three and one-half to four millimeters in the right eye. The left eye was atrophic, and a diagnosis was made by another practitioner of optic neuritis.

The young girl had never menstruated, and her genital organs were of the infantile type. The woman, thirty-five years of age, menstruated at the age of twelve, continued to do so for six years thereafter, then menstruation suddenly ceased and she had not menstruated since. This patient had the characteristic bitemporal headache and the dizziness which accompanies it.

After detailing the present condition of vision, Dr. Suker stated that as soon as he got permission he was going to do a subtemporal decompression, because the X-ray plates showed such an extensive involvement of the pituitary body that the condition could not be dealt with by the transsphenoidal method.

In the case of the young girl, to get rid of the cerebral hernia, he detailed an operation which he contemplated doing.

If ophthalmologists were a little more particular in differentiating between choked discs and simple optic neuritis, they would find more cases of intracranial pressure, pituitary or otherwise, than they do at the present time.

Discussion.—Dr. Derrick T. Vail, Cincinnati, said the benefit which had followed in one of Dr. Suker's cases was due solely and entirely to the decompression, taking off cerebral pressure by having a large opening made in the skull; but the real disease he still believed from the symptoms presented was in the pituitary body, and he did not know whether subtemporal decompression, which Dr. Suker contemplated doing, would accomplish much or not.

Dr. Lee W. Dean, Iowa City, Iowa, stated that about six or eight weeks ago a patient came under his observation with pituitary hypertrophy. The X-ray showed a shadow indicative of a large tumor, with atrophy of the optic nerve. The patient was barely able to see to move around. The pressure seemed to be local. There was no evidence of general pressure. He followed Harvey Cushing's advice and did pituitary decompression through the sphenoid. When he incised the dura the tumor bulged out, and it extended down so that it could be seen in the nose, and, strange as it might seem, by

very careful observation it was shown this man's vision had returned to a certain extent. The diagnosis proved to be sarcoma, and the man at present, eight weeks after the operation, was practically comatose.

Dr. J. E. Loring stated in reference to choked disc, that the case he expected to present illustrated what Dr. Suker was endeavoring to impress upon the members. The patient was referred to an ophthalmologist on account of headaches for refraction. The patient was refracted. She had compound myopic astigmatism, and was informed she should be refracted within a year. The patient this time went to one of his co-workers and a rerefraction was made; and without studying the fundus, he took it for granted this had been done previously. On examining the fundus Dr. Loring found she had all the characteristics of a typical choked disc, in contradistinction to optic neuritis, a case of which he had hoped to present. In this case there was luetic infection. Vision had not been impaired within the past year, but the field was contracted to a considerable degree. Central vision remained acute.

The case had symptoms from the neurologic side, for which he was indebted to Dr. Mettler. There was a reduction of power in the arm and left leg; she had increased patellar tendon reflex on that side, and, if anything, it was diminished on the other side. The pain was on the right side of the head.

Intranasal Drainage of the Lacrimal Sac—A Simple Method.

Dr. J. A. Pratt, Aurora, Illinois, stated that the intranasal drainage of the sac places the eye in the only logical method to utilize the normal drainage of the conjunctival space, and the man who suggested this certainly made a tremendous stride in the right direction, for he may have made it possible to relieve nearly all the ills of the lacrimal sac.

The West or any other operation that establishes a drainage into the nose intranasally fulfills this requirement, but they are difficult to do.

December 1st he operated on W. B. for a purulent dacryocystitis of one year's standing, which had been treated by one of our specialists with the usual routine of probing and washing. The sac was opened and an antrum trocar was pushed through the nasal wall of the lacrimal fossa. Pus dis-

appeared from the conjunctival sac and has not been present since, although the eye shows tears standing in it. The inflammation and disagreeable sensation are gone. This showed the benefit of surgical drainage.

After referring to the anatomy, Dr. Pratt stated that in the West and other operations of the sac the operator first destroys the mucoperiosteum, the bony wall of the fossa, and then opens the nasal portion on the sac. In this simple method the action is reversed, but of course the result is just the same.

Those who are not trained to the use of the bur in their work do not realize how hard it is to cut soft tissue unless it is held against something hard. One can remove the bony covering of the lateral sinus without injuring the sinus wall, so in using the bur in the lacrimal sac it only cuts where it is held against the bony wall.

Under cocain anesthesia the same technic is used inside the nose as in resection of the septum. The eye is cocainized and both puncta dilated and canaliculus probed to the sac. The sac is now injected with ten per cent cocain in epinephrin. If both canaliculi are patulous and neither has been cut, it is preferable to use the upper, as the healing leaves the upper part of the lacrimal apparatus in its normal condition. If the lower has been slit, the opening into the sac can be enlarged from the old cut.

A canaliculus knife is now passed through the upper punctum down to the bottom of the sac, the handle is now turned down and an opening made in the upper part of the sac at least five millimeters long so that a number 14 Theobald lacrimal probe can be pressed through the sac.

The cotton is now removed from the nose, and the nasal clasp is placed so as to protect the septum from the bur. The bur is now passed to the bottom of the sac with the shaft of the bur at 45° and pointing toward the opposite side of the chin. The engine is now started and by gentle pressure a hole is burred into the nasal cavity. The hole is now enlarged up and down, and when the bur stops turning it is removed. The bur should never be placed or removed while in motion. The nose is now inspected and any shreds are nipped off with the cutting forceps.

The sac is washed out, clots removed and a superficial suture is used to close the cut in the sac. Unless there is infection

it is not necessary to wash the sac until the wound in the upper part of the sac is healed, and then but a few times.

Before closing the sac it is well to feel with a small curette if there are any diseased conditions, and, if so, act accordingly. He always flushes the eye with a forty per cent argyrol solution before closing the sac.

This method can be used in combination with the West operation in this way: After the mucoperiosteum has been removed, then continue the operation through the external route with the bur as above described. In this way the hard part of the West operation, which is the removal of the bone and cutting into the sac, is avoided and the procedure greatly simplified.

The logical reasoning following the simple method to establish the intranasal drainage of the lacrimal sac turns on whether it would not be possible to reestablish intranasal drainage after the lacrimal sac has been removed, if intranasal drainage proves itself.

It has always impressed the speaker that the condition nearest to normal is the best for the individual concerned.

He suggested the following technic: General anesthesia would be preferable, to avoid swelling. An incision should be made just inside the lower lid from a point a little above the center of the internal canthus to a little past the lower punctum, down to the bone of the lacrimal fossa. The knife is now passed to the bottom of the fossa with the cutting edge toward the nose, the handle brought down and so cut the tissue in the fossa to the bone. The fossa is cleaned as much as possible with Freer's sharp elevators. The bur is now used to make an opening into the nasal cavity about the size of a Number 4 Theobald probe.

A strip of mucous membrane is now dissected from the lower fornix, from the temporal side to the internal canthus, but allowing it to be attached at that point. The wound is now sutured and a suture fastened to the end of the mucous membrane strip. This strip is now passed into the nose through the hole previously made, and the suture anchored to the outside of the nose. A metal cannula with an enlarged head about the size of a Number 12 Theobald probe, and nineteen millimeters long, would be passed into the oculonasal opening to keep the hole open and the mucous membrane in

position until it grew in place, when the opening would remain patulous.

Up to date Dr. Pratt has performed seven of these operations which he reported in detail.

Dr. Pratt is now using a round bur of the same diameter—three millimeters—to make the initial hole. He also has another set of two millimeter burs to use when the sac is small. One is apt to make the hole in the bone too small, and care should be used. In cases where styles have been used it might be better to wear a short style through the new opening until the induration has subsided.

Discussion.—Dr. Frank Brawley thinks there might be a distinct objection to the intranasal operation on the ground of traumatism to the lacrimal sac, but perhaps Dr. Pratt's method of suturing might overcome that; and yet it added considerable difficulty to the operation. It undoubtedly has its advantages in cases where, from the anatomic difficulties, such as deviated septum, the eye was high up out of the operative field; but even in those cases he thought the bur which he mentioned at a previous meeting could be used very readily. Whenever one is dealing with a dacryocystitis the anterior ethmoid cells are under suspicion. Where the operation is intranasal and one has an opportunity to drain the anterior ethmoid cells, it will prove a serious complication unless they are drained at the time of operation or later, as found necessary.

In the case he presented to a previous meeting of the society as having been operated on three and a half months ago, and again shown tonight, the drainage was going on uninterruptedly. The operation described by Dr. Pratt he thinks will be of advantage where the canaliculi have already been slit, but he feels that it is incorrect to disturb the lacrimal apparatus at all; that if a probe can be introduced into the lower canaliculus by strong dilatation and the pump action maintained, it should be done if possible.

Dr. J. Sheldon Clarke, of Freeport, spoke of the West operation, and stated that he had described its technic at a previous meeting. What one wishes to get is not only drainage of the sac, but a functioning tear apparatus. Any method that would do this and drain the sac into the nose was a good one. The operation suggested by Dr. Pratt could be done in the presence of phlegmon, but one would hardly care to undertake

the external operation in such a case. In all these cases a permanent result is desired, and time would tell which is the better method for maintaining a permanent fistula into the nose. Unless the septum is removed, he thinks synechiæ would follow the operation and defeat the aim of securing permanent drainage. The West operation he had done in seven instances, in association with Dr. Pratt.

Dr. Clark then exhibited some drawings showing the steps of the operation of West, and also some instruments that are used in doing the operation, and likewise detailed the cases on which he had done the West operation with satisfactory results. The intranasal drainage of the tear sac is the right way to establish surgical drainage of the lacrimal sac.

Dr. Pratt, in closing, said the opening from the sac to the nose is easily made, and can be enlarged to any desirable size. On the size of the bony opening depends whether it will close or not. The opening should have a vertical measurement of eight millimeters and a horizontal of six millimeters. The suturing of the opening in the sac places the lacrimal apparatus in its original position. The majority of the cases we see now have an opening in the sac, so the condition is not exaggerated, and we have the benefit of drainage.

The forming of synechiæ is less apt to occur in this operation than the West, as the septum is protected, and so precludes this condition, while in the West the irritation of the instruments in the nose will abrade the mucous surface.

PAUL GUILFORD,
Secretary.

COLORADO OPHTHALMOLOGICAL SOCIETY.

Meeting of December 19, 1914. Dr. Melville Black presiding.

Atrophy of the Choroid, Retina and Nerve.

Dr. Otis Orendorff presented a male cook, aged sixty-one years, whose vision had been failing for the past six years, and rapidly so the past few months. It is now $1/20$ in each eye, unimproved by lenses. No laboratory tests had been made, but the most careful inquiries into the patient's history failed to explain the cause of the trouble, which is shown by the ophthalmoscope to be atrophy of the choroid, retina and nerve.

Discussion.—Dr. E. R. Neeper said that the prognosis was bad. He would suggest looking into the nasal condition.

Dr. Orendorff said that nothing was found in the nose to explain the condition.

Dr. F. R. Spencer said that it might possibly be due to syphilis, and suggested Wassermann.

Dr. C. A. Ringle had had two such cases, but could not find the cause. He could suggest nothing in the line of treatment.

Dr. W. C. Bane referred to a similar case that he had seen in 1891.

Dr. Edward Jackson thought the prognosis hopeless. The condition of the retinal vessels might point to syphilis. Exposure to heat might have some bearing upon the choroiditis.

Dr. Melville Black remarked that as it was the habit of cooks to eat more or less all the time, a toxic element may have been causative. He did not believe it due to syphilis, but would suggest that all laboratory methods be resorted to for the purpose of clearing up the etiology.

Dr. W. A. Sedwick suggested that pyorrhea might enter into its causation, and would have the condition of the mouth carefully looked into.

Injury to Eye by Iron—Traumatic Cataract.

Dr. W. A. Sedwick presented a man, laborer, age thirty-two years, whom he had seen ten hours after injury. While breaking an enameled cast iron bed with a hammer was struck in right eye by a piece of iron. The wound of entrance extended

transversely from limbus to limbus, and the foreign body, which weighed seventeen grains and measured twelve by ten millimeters, was found in a perpendicular position just in front of the lens, with part of the iris, which was lacerated, in front of and part behind the foreign body. In attempting to remove the foreign body by means of the magnet, Drs. Bane and Stillwill assisting, it was found necessary to incise the cornea vertically from the horizontal wound to the limbus above. The eye has given no evidence of infection, and at no time has the patient had pain. Present condition: Traumatic cataract, inflammatory exudate in anterior chamber, reduced tension, eye somewhat congested with perception of light.

Discussion.—Dr. D. H. Coover thought that there could be little doubt that the eye would have to be removed.

Dr. E. R. Neeper questioned the advisability of incising upward, and thought if it were necessary to have more room, with the idea of conserving vision, it had been better to have incised along the limbus.

Dr. Bane thought the procedure followed in this case proper.

Glioma.

Dr. D. H. Coover presented a baby one year old with the following history: When two months old the left eye turned in. Did not notice that the eye was larger than the right eye at that time. When the child was six months old the parents noticed that scum had formed over the left eye, that its color was darker and that the eye was larger; since that time it has gradually increased in size. Now the cornea is hazy and large, anterior chamber shallow, pupil slightly dilated and fixed, tension elevated, with yellow reflex from posterior chamber.

Discussion.—Dr. Edward Jackson said that the case was probably glioma.

Dr. G. L. Strader remarked that the few cases that he had seen had appeared whiter than in this.

Dr. Melville Black: The question is whether this eye should be removed or not. Said that he would remove it and make the diagnosis afterward.

Dr. E. T. Boyd said that even with such procedure we would be doing as well as the general men, as shown by the investigation of Cabot at the Massachusetts General Hospital, where it

was almost an even break whether the diagnosis were correct or not.

It was the consensus of opinion of those present that the eye should be removed. Dr. Coover was asked what he would place in the cavity, to which he replied, Fox's gold ball in Tenon's capsule.

Dr. Coover later removed the eye and the pathologist verified the diagnosis of glioma of the retina.

Fracture of the Right Lower Orbital Margin With Paralysis of the External Rectus.

Dr. G. L. Strader exhibited a boy of nineteen years, who on November 21, 1914, fell twenty-five feet from a telephone pole, striking on his head. Was unconscious for a time and has had double vision since. The condition above mentioned obtained, and Dr. Strader wanted to know the outlook for recovery.

Discussion.—Dr. Jackson thought it too early to predict the outcome, but thought possibly that the paralysis may have been due to hemorrhage and that there might be complete recovery.

Dr. Black referred to a case that had paralysis of the external rectus from a blow upon side of face, which did not recover.

Dr. Neeper spoke of a case that he had reported of paralysis of the external rectus following a fall from a bicycle. For six months there was no improvement, but in the next six months complete recovery had taken place.

Dr. Ringle stated that he had had three similar cases. Two recovered, but the result was unknown in the third.

Lens and Vitreous Changes Following Trauma.

Dr. Edward Jackson reported the case of A. G., whose left eye was cut by a flying piece of steel in 1904. In 1911 the right eye was struck by water from a nozzle under one hundred pounds pressure, at two and one-half feet distant. Has suffered from malaria. October 3, 1913, vision in right eye was 4/30; in left eye 4/80. Right eye: Fine opacities in anterior vitreous; fundus normal. Left eye: Linear opacity in cornea to nasal side of pupil. Dust-like opacities in the lens, with larger dots near the posterior pole. Opacity of central portion of the vitreous. Fundus dimly seen appears normal. No evi-

dence of foreign body. Present vision: Right eye, 5/15; left eye, 5/30. Vitreous has cleared some in both. Dionin two per cent has been used and iodid potassium given.

Case 2.—Dr. Jackson also made report on a case that had been shown by him at the October meeting, in which a man had been violently struck by a board on the outer edge of the left orbit, resulting in immediate blindness of the left eye. The fundus was pushed forward and showed choroidal vessels. At that time the tension in right eye was 32 millimeters and in left eye 6 millimeters. Since October tension in left eye has varied from 0 to 17 millimeters. No light by transillumination. Mass appears more pushed forward.

Discussion.—Dr. G. F. Libby, because of the fundus being forward, would not believe the condition due to hemorrhage, but would consider a growth.

Dr. Melville Black thought that the contraction of an organized clot might have brought the fundus forward, but the eye was one that should come out.

Dr. E. R. Neeper did not favor the idea of growth, and believed that the result would show it not to be.

Dr. E. E. Edmonson (Mt. Vernon, Ill.): Such eyes are of no value and should be removed because they are dangerous. Uveitis being present in the offending eye, sympathetic ophthalmia may develop.

Dr. Neeper, referring to the use of dionin, said that he believed it better to use a five per cent solution once a week rather than the weaker solutions more frequently, thus avoiding tolerance being established.

Blepharochalasis.

Dr. Melville Black presented a boy with what he believed to be blepharochalasis.

Some of the gentlemen were disinclined to agree with Dr. Black, and attributed the edematous and boggy condition of the upper lids, with the existing ptosis, to trachoma, though the patient gave no history of such infection. The case will be kept under observation.

Acute Inflammatory Glaucoma Both Eyes—Sclerocorneal Trephining With Perfect Result for a Year.

Dr. Black presented the case of a woman, age fifty-nine years, with general arterial sclerosis; blood pressure 200 milli-

meters. Patient first seen December 20, 1913, at which time she was just recovering from grip; the day before, the left eye had become inflamed, painful and vision poor. At the time of the examination the vision of the left eye was reduced to light perception; cornea steamy, pupil dilated and tension 70 millimeters Hg. Eserin was instilled every five minutes for an hour, but with no effect.

Her right eye was normal in every particular—vision, tension and nerve head.

The left eye was operated upon by Elliot's trephining with a 2 millimeter trephine driven by the von Hippel instrument. The next morning vision was returning in this eye and there was but little reaction; but the right eye was red, cornea steamy, vision lowered and tension up to 60 millimeters. Eserin promptly cleared up the symptoms and controlled them until the left eye was well enough to be used, then the trephining operation was done on the right eye.

In the right eye the coloboma does not include the pupillary margin, while in the left it is complete, with the typical key-hole pupil. Over the trephine openings there were small, distinct, clear blebs through which can be seen the open, dark trephine hole in each eye. Proper filtration is evidenced by the slight edema present on either side of the cornea. Her vision is:

O. D., 20/20 W — 2.50 com. W — 1.00 ax. 165.

O. S., 20/20 W — 2.50 com. W — 2.50 ax. 23.

Visual fields are normal.

The doctor says: "I regard the result in this case as perfect, and see no reason to believe that the filtration which has been going on so satisfactorily for a year will not continue to do so as long as she lives. In this case, by the way, we used four grain doses of chloral hydrate t. i. d. off and on, to reduce her blood pressure, which it did in a most satisfactory manner."

Glaucoma Simplex—Trephining.

Dr. Black reported the following case: Man, age forty-six years; occupation, plumber. Duration of trouble, two years. First saw patient November 25, 1914, at which time vision was: Right eye, 20/200, and left eye, 20/70. Ophthalmoscope: 5 D. cupping of each disc, the excavation involving the entire disc. Visual fields contracted to about 5° in all meridians.

Patient can scarcely get about alone. Tonometer (Gradle's mod.): Right eye, 40 millimeters; left eye, 38 millimeters. Prescribed eserine, one-half of one per cent, which brought down the pupils and tension. Blood pressure 120. November 27th, Elliot's trephining in each eye with a 2 millimeter trephine driven by von Hippel's mechanical instrument. Very little reaction followed the operation. The conjunctival blebs are pronounced. Atropine was used for a few days following the operations until the time for iritis to develop had passed. December 15th patient was brought to the office and examined, and his vision found to be the same as before operation. The field of the right eye had extended in the temporal portion to forty degrees, but had not improved in the vertical. No improvement in left field. The most marked improvement is shown in the cupping of the discs, the only sharp edges being on the nasal sides, and they have the appearance resembling physiologic cups. The tension at this time was: Right eye, 14 millimeters, and left eye, 17 millimeters Hg. The blebs over the trephine openings are clearing so that the dark trephine holes can be seen. Colobomata are symmetrical.

Dr. Black also presented a woman, age fifty-six years, who had that day consulted him and found to have subacute inflammatory glaucoma of the right eye and for whom he had prescribed eserine. She gave a history of recurring attacks and the tension was 66 millimeters. Eserine having failed to affect the pupil, alleviate the pain or reduce the tension, the doctor did a sclerocorneal trephining in the presence of the members of the society.

Acute Inflammatory Glaucoma—Trephining.

Dr. W. H. Crisp presented a case on which he had operated a few days before, doing a sclerocorneal trephining, obtaining perfect drainage and consequent subsidence of all the untoward symptoms.

Dr. Coover showed the field chart of a case operated by him for glaucoma: the patient had been advised not to be operated. The direct result was to increase the field, but at the last examination the field was reduced with normal tension.

Discussion.—Dr. Nepper said that the high frequency current for twenty minutes would have reduced the tension. Also voiced his objection to the button being hinged, believing that remnant of flap blocks opening.

Blastomycosis.

Dr. Jackson reported a case of blastomycosis in which he had applied silver to the ulcerated lids and given iodid potassium internally. As much as thirty grains were given three times a day, the treatment being followed by recovery.

New Sideroscope.

Dr. Bane exhibited and demonstrated a sideroscope of his devising and which he had had constructed by a local firm. The principal feature of the instrument was its cheapness.

Meeting held January 16, 1915. Dr. A. C. H. Friedman presiding.

Wound of Cornea, Iris and Lens.

Dr. A. C. Magruder presented a girl, five years of age, who, two and a half years ago, had received a penetrating wound of the cornea, iris and lens. Present condition: Light perception; no anterior chamber or pupil; globe somewhat atrophic with elevated tension.

Discussion.—A few favored an operation upon the iris, but the majority were in favor of enucleation.

Dr. Magruder also presented a man, seventy-two years old, who claims that a fall from a scaffold six years ago had damaged his vision and caused cataract.

The fundus shows a condition of apparently old hemorrhagic retinitis with cholesterin in the vitreous, but no evidence of cataract.

Discussion.—Some thought that the present ocular condition preceded the injury, while others believed that the injury might have been responsible for the condition present.

Sclerokeratitis.

Dr. E. R. Neeper presented a woman, aged fifty-five years, with sclerokeratitis; von Pirquet positive. He had not been allowed to give tuberculin.

Discussion.—Dr. Edward Jackson and Dr. Melville Black emphasized the importance of tuberculin administered for its general and focal reactions as well as for its therapeutic effect in this class of cases.

Dr. Neeper said that he thought the tendency at present was to overrate the importance of tuberculosis as an etiologic factor in many ocular conditions where the cause was obscure.

Glaucoma With Marked Iris Atrophy.

Dr. Neeper presented a woman of sixty-two years. Eleven years ago Dr. G. L. Strader of Cheyenne, Wyoming, did a posterior sclerotomy upon the left eye, and later an iridectomy; the eye became blind, developed a cataract which has been partially absorbed, although there is much lens matter with inflammatory debris in the occluded pupil. Eight years ago a severe attack in right eye with recurring attacks of lesser moment since, the last being in November, 1912. Neither eye has been painful for the last two years, during which time the atrophy has been more pronounced. Vision in right eye, 20/20 partly. With correction $+ 0.25$ with $+ 0.37$ ax. $90^\circ = 20/20$. Vision in left eye was movements through atrophic coloboma near temporal limbus.

Keratoiritis—Blindness Following Postpartum Hemorrhage With Recovery of Vision.

Dr. J. R. Robinson presented a woman aged thirty-eight years. Right eye nearly blind, with eccentric vision from squint; has been inflamed six months. Six months ago, following postpartum hemorrhage, the left eye became blind, but vision was recovered. Right eye became inflamed and painful, with cloudy cornea, last December; the iris was bound down by adhesions which were broken with atropin. The cornea has been cloudy since August.

Traumatic Keratitis.

Dr. J. A. Patterson's case was a man, aged thirty years; mill worker. First seen in December, 1914. Right eye had then been inflamed for three weeks without pain; then denied injury, but subsequently it was learned that he got some powdered ore or dust into the eye while sweeping above his head. There was a central corneal opacity involving the deep layers that stained in spots. As foreign bodies were believed to be present, the spots were gently curetted and silver nitrate fifty per cent applied. Subsequent history disclosed the fact that

a workman had supposedly removed a foreign body from this eye when first injured. On December 31st a 1:2000 cyanid of mercury was injected, and the next morning the pupil dilated easily. Injections of a solution of cyanid of mercury (with acoin), 1:2000, 1:1500 and 1:1000, were given January 2d, 7th and 13th, respectively, and the eye progressed to a favorable termination, though a permanent central leucoma is probable.

Discussion.—Dr. Patterson believed that the use of cyanid of mercury injection was responsible for recovery of this man's eye.

Dr. Black fully agreed with Dr. Patterson.

Dr. Neeper thought it important to determine the nature of the bacteria causing the ulceration, and cited cases of pneumococcic infection which had cleared up like magic under the use of ethylhydrocuprein hydrochlorid.

Dr. Black remarked that he had procured some of the new specific for the pneumococcus (ethylhydrocuprein), but that it would not dissolve, and he was glad to know that it was the hydrochlorid which is soluble in water and oil and which was specially made for use in the eye. He called attention to its supposed danger of causing quinin amaurosis when used in too strong solutions. Dr. Black also mentioned that he had found that a one-third grain novacain tablet dissolved in the syringe of cyanid of mercury solution rendered the injection practically painless.

A Case of Leucoma Adherens and One of Optic Atrophy.

Dr. Friedman showed two cases. One a case of leucoma adherens in the right eye of a girl of sixteen years, and the other a case of optic atrophy in a man of seventy years.

New Trephine.

Dr. Neeper made preliminary report of a trephine that he had devised for making an opening from the lacrimal sac into the upper part of the nose. False passage is then maintained by the wearing of a style.

Meeting of February 20, 1915. Dr. Edward Jackson presiding.

Penetrating Injuries to the Eyes—Result of Explosion.

Dr. E. T. Boyd presented a man, aged thirty-four years, miner, who on December 10, 1914, picked into a missed hole. Dr. Strong of Leadville saw the case about one hour after injury, when there were a great number of foreign bodies in the cornea of each eye and a perforation of the sclera of the right eye between the insertions of the internal and inferior recti muscles. The external wound in the conjunctiva was slightly obtuse, with its apex about five millimeters from the sclero-corneal junction, extending vertically for ten millimeters. The scleral wound was five or six millimeters long; a bead of vitreous presenting was snipped off.

In the left eye there were numerous corneal perforations and a splinter of wood in the cornea presenting in the anterior chamber.

Present Condition.—Right eye: Conjunctival scar showing extent of wound. Pupil oval horizontally three millimeters greater in diameter than the left; reactions normal. Cornea scarred with some foreign bodies imbedded and covered with epithelium. Disc blurred. Fundus changes in the way of exudates corresponding to the scleral wound. Vision, 20/100 plus 1.

Left eye: Corneal scars with some foreign bodies remaining. On the anterior surface of the iris there are four pieces of rock at about six of the clock dial, one at eight, one at eleven, and some particles at three and four; all these are small and none of them more than one-half millimeter in diameter. In the lens there are five small pieces of rock, three on the capsule and two located more deeply. No fundus changes. No foreign bodies demonstrable in the vitreous of either eye by means of the ophthalmoscope. Vision, 20/100.

Discussion.—Dr. G. F. Libby said that he had had a similar case in which numerous foreign bodies remained imbedded in the cornea. With the cornea smooth, no staining and no indication of irritation about the eye, he thought it best to allow them to remain.

Dr. J. A. Patterson would like to know the probable prognosis in this case, and said that he thought that such cases went to the bad.

Upon Dr. C. E. Walker's statement that the superficial foreign bodies should be allowed to remain, Dr. Patterson replied that he referred to the deeper ones, those within the eye doing damage.

Dr. Edward Jackson spoke of a case with fully fifty foreign bodies in the cornea and some in the lens in which the lens had remained clear for a long period of time. He thought that possibly in this case the left lens might become opaque later, but said that pieces of stone are far less liable to cause trouble than other substances.

Dr. W. F. Matson referred to the frequency with which coal miners get foreign bodies imbedded, and cited a case where a piece of lime rock had penetrated the cornea, rested upon the iris and had become encysted; subsequently, iritis developed and the doctor had removed the foreign body with a piece of iris.

Dr. Jackson said that it might be that there was a foreign body in the fundus of the right eye.

Dr. Patterson thought it too early for this man to think of final settlement on account of his injury.

Dr. Boyd, in closing, said that radiograms had been made, but that he had not heard from the radiographer.

Dr. Jackson remarked that if a foreign body were present in the right eye, that it was probably too small for the radiogram to show it.

Dr. Boyd, continuing, said he did not believe that there was a foreign body in the right eye, but believed the appearance of the fundus to be due to exudate the result of the penetrating trauma. He was of the opinion that the left lens would remain clear, and that the man would be perfectly safe in making settlement with the insurance company at this time. The foreign bodies in the corneæ should not be disturbed at this time, but sooner or later some would have to be removed, as they had a tendency to work through the epithelial covering and cause trouble.

Complete Atrophy of the Optic Nerve Coincident With Abscess of Lacrimal Sac.

Dr. Boyd: Mrs. M., age thirty-five years, was presented. She was referred to me February 11th, for examination and certificate with reference to the condition of the right eye, which she claimed was blind.

Being suspicious of all cases that hope to derive pecuniary benefit from loss of vision of one eye, I examined her very carefully, using diplopia test—strong plus lens over admittedly good eye—red and green letters on glass, with first red and then green lens over left eye—all of which showed the right eye to be blind. The pupils are of equal size and associated movements normal, but there is no pupillary reflex to light thrown upon any portion of the retina of the right eye.

The ophthalmoscope reveals complete atrophy of the right optic nerve. This woman gives the following history: Married, seven living children, two died at birth, and she has had two miscarriages. Five years ago had abscess of the right lacrimal sac, and again two years later. Last August she again had abscess of the right lacrimal sac, the whole region in and about the eye being enormously swollen for about one week; the abscess then ruptured, swelling gradually subsided, and so soon as she was able to open the eye she discovered that she was unable to see with it. She is positively certain that before this attack she had not noticed diminished or impaired vision of the eye.

Save that above mentioned, the woman has never been ill a day except during her numerous confinements. There is no specific history. Both nasal ducts are more or less obstructed, with dacryocystitis on the right side.

It is very unusual for retrobulbar neuritis to be coincident with or to arise from abscess of the lacrimal sac, and in this case the inflammation must have been very severe and extensive, amounting to orbital cellulitis.

It was not necessary to syringe the right sac to demonstrate the presence of pus, but she being averse to instrumentation, the left was not explored. Taking into consideration the condition of the right eye and its cause, together with the obstruction now present on the left side, I believe that it would be good practice to remove the sacs, or do the equivalent, obliterate them both by means of trichloroacetic acid, after the method of Gifford.

Discussion.—Dr. W. H. Crisp was skeptical with regard to the sac inflammation being the cause of the atrophy.

Dr. W. C. Bane had never seen optic atrophy from such cause. He spoke of the peculiar appearance of the disc wherein the vessels at the bottom of the cup were flattened and devoid of color.

Dr. A. C. H. Friedman thought that the atrophy may have been due to fracture at the foramen, and said that it would be about as hard for Dr. Boyd to prove that it was not as it would be for him to prove that it was due to the inflammation.

Dr. A. C. Magruder had seen a similar case, and believed that the atrophy may have been due to the cause assigned.

Dr. C. E. Walker said that the sinuses might have been originally at fault.

Dr. F. R. Spencer believed that Dr. Boyd might be right.

Dr. E. R. Neeper had never seen atrophy from such cause, but believed it to be entirely possible.

Dr. Edward Jackson cited two cases of atrophy from orbital cellulitis, and spoke of atrophy following injection of paraffin into the nose.

Keratoiridocyclitis.

Dr. H. R. Stilwill presented a woman, age thirty years, who consulted him January 9, 1915, and whose vision at that time was: Right eye, 4/60; left eye, 3/60.

The following history was given: Usual diseases of childhood. Had pneumonia ten years ago. No cough except when she has a cold. Mother died of pulmonary tuberculosis. Her general health is fair. Weight one hundred and fifteen pounds. Has one healthy child living, and has had one miscarriage. No history of lues. Has had trouble with eyes for years. Used to have "ulcers," which were cleared up with "yellow salve." Had glasses fitted by Dr. Strickler fifteen years ago.

Last November had an acute inflammation in the right eye, and has been under treatment since. There was a similar trouble in the left eye a few months previously, but the eye is quiet at the present time.

In the right eye there is circumcorneal injection. Photophobia, but little pain. Not worse at night. The pupil is slightly dilated and irregular. There is a bank of whitish exudate with brownish pigment in the pupillary opening. Iris is not much discolored. There are several small whitish spots in the corneal substance. The tension minus.

The left eye is quiet. The pupil is partially dilated and shows posterior synechia. There are spots of iris pigment on the anterior capsule. Also several spots of interstitial scars.

On January 20th a Wassermann showed negative, and a

von Pirquet was positive. Patient was seen by Dr. Schultz on January 24th, who found dullness in the right apex and small moist rales on forced respiration and cough. There is also slight dullness in the left apex. She has had four injections of tuberculin (T. R.). The first 1/500,000; second 1/400,000; third and fourth 1/250,000 mg. There was no reaction with the first injection, slight reaction following second, and a strong reaction after the third.

On February 17th both eyes are quiet except some redness in the right. She has gained three pounds. Vision in right eye, 5/60; in left eye, 3/60.

Has occasional pain toward evening in the right eye.

Discussion.—Dr. W. C. Bane first thought it to be luetic, but now believed it to be tubercular.

Dr. W. A. Sedwick did not see the case, but asked if the patient had been on antisyphilitic treatment before the Wassermann had been made.

Dr. Stilwell replied that Dr. McCaw could say more about that than he.

Dr. McCaw stated that the case had come to him through Dr. Chase, and that she was taking one and one-half grains protiodid a day.

Dr. Sedwick remarked that this may have served to modify the Wassermann.

Dr. F. R. Spencer thought it to be tubercular, as it did not look specific to him.

Dr. Stilwell, in closing, said that the diagnosis was based upon its slow development, together with the facts that the woman is tubercular and the eye had been getting worse under specific treatment.

Injury to Eye—Iris Prolapse.

Dr. W. H. Crisp showed a man, age twenty-four years, who three days before consulting him on February 1, 1915, while driving a staple, was struck in left eye by it. When first seen there was a fair sized prolapse of the iris at the upper limbus. Prolapsed iris was abscised under cocain. Atropin instilled before and after.

Discussion.—Dr. Spencer congratulated Dr. Crisp upon the good result obtained.

Proptosis of Right Eye.

Dr. Finnoff presented a girl with this condition. Report and discussion deferred.

Extended Tenotomy for Convergent Squint.

Dr. Edward Jackson presented a young man, age twenty-one years, who consulted him November 19, 1914. His left eye has turned in since he was ten years old. Vision, right eye, 5/3 partly; left eye, 5/5 partly. Convergence forty-five to fifty centrad. Correction:

O. D., plus 1.00 combined with — 0.37 cyl. ax. 95°.

O. S., plus 1.75 combined with — 0.50 cyl. ax. 10°.

December 17th: Convergence forty to forty-five centrad. Extended tenotomy left internus and nasal two-thirds of superior and inferior recti. Two conjunctival stitches, which were removed on the third day. There is now slight convergence, and he does not possess binocular single vision, but he readily suppresses one image and is not troubled by failure to fuse the images.

Discussion.—Dr. F. R. Spencer asked if Dr. Jackson expected greater effect as time went on than that he now had.

Dr. Jackson replied that he did not look for decided change in this respect.

Dr. Spencer then wanted to know why extended tenotomy was chosen rather than advancement.

Dr. Jackson said because it is the less formidable operation.

Dr. J. A. Patterson inquired whether at the time of operation one eye was higher than the other, to which Dr. Jackson replied that insofar as could be ascertained they were level.

Dr. E. R. Nepper raised the question as to choice between tenotomy and resection, saying that he was opposed to advancement and favored resection with attachment of the muscle to the place of original insertion, as the operation was more easily performed and, in his opinion, gave better results even than an extended tenotomy.

Dr. J. A. Patterson: Would you operate a child of seven without fusion faculty, or would you wait until twelve years of age or later?

Dr. Jackson said that he would wait until puberty if fusion were not perfect.

Dr. W. C. Bane spoke of Dr. Melville Black's operation for advancement, and the good results that he had obtained from it.

Dr. A. C. Magruder asked what procedure should be followed in a child twenty months old, with marked convergent strabismus and 3 D. hyperopia—shall glasses be put on?

Dr. Jackson said to put them on and probably the child would soon get to the point where it would object to having them off.

Tuberculosis of the Retinal Vessels.

Dr. Edward Jackson presented two such cases. In the first case the vision got dim in the left eye last May; in the right, first of July. Got better, then worse again.

December 28, 1914: Vision, right eye, perception of light; left eye, 1/45. Vitreous hazy, retina swollen, white and gray masses in the vitreous. Right upper temporal vein very large and tortuous. Left, remains of hemorrhage near vitreous. Dr. Bane reported mastoid and sinuses sound.

January 19, 1915: O. T. injection followed by headache, nausea and pyrexia.

February 2, 1915: Vision, right eye, fingers at three inches; left eye, 5/12.

His second case gave history of poor vision in September, 1914. In October vision in right eye was fingers at six inches. Vitreous opacities, white spots in macula. Slight anemia, blood otherwise normal. Negative Wassermann and negative von Pirquet.

November 27: O. T. injection, followed by temperature of 99.1° and retinal reaction. Special attention was called to the appearance of the vitreous, optic nerve and retinal vessels, particularly the upper temporal. To be reported in detail.

Discussion.—Dr. Neeper thought the condition in the first case was due to some general infection, while in the second case he believed that during his examination he detected odor that would indicate necrosis somewhere.

Rupture of Globe, Dislocation of the Lens and Detachment of the Retina.

Dr. C. A. Ringle gave the following report of a case of injury to the eye: Mr. B. was brought to my office by Dr. Nelson of Windsor, on June 1, 1914, for an injury of the

eye resulting from the sudden release of the lever of a beet cultivator. The lever was described as about two and one-half feet long by one and one-half inches wide by one-fourth inch thick. Inspection showed a wound along the lower edge of the orbit. The skin on the under surface of the upper portion of the orbit was abraded, from which we infer that the end of the lever passed clear of the upper edge of the orbit, delivering the full force of the blow upon the globe and fracturing the orbital portion of the superior maxillary bone, so that there can now be felt a deep indentation directly below the globe.

When first seen the eye was closed by swelling. Several days later, inspection of the eyeball revealed a profuse hemorrhage in the globe. The globe was very sensitive and painful, with exacerbations at night. There was a dark streak under the conjunctiva about five millimeters from the upper edge of the cornea. Absorption of the blood clot continued over a period of several weeks, when finally the eye cleared. The ball was soft and markedly shrunken.

Enucleation was done five months after the injury. The hardened eye was presented.

Discussion.—Dr. Bane asked if the injury extended through the ciliary body, and Dr. Ringle replied that it did not.

Ophthalmological Congress to Be Held in Denver.

The Colorado Ophthalmological Society is arranging for an Ophthalmological Congress, to be held in Denver, July 22nd and 23rd, 1915, to which all ophthalmologists are invited.

E. T. BOYD,
Secretary.

PHILADELPHIA POLYCLINIC OPHTHALMIC SOCIETY.

Meeting of December 10, 1914.

SYMPOSIUM ON DISEASES OF THE PITUITARY BODY.

The Ocular Symptoms.

Dr. William Campbell Posey said that owing to the intimate anatomic relationship which exists between the pituitary body and the optic and motor nerves of the eye, the ocular symptoms are the most frequent and important of the neighboring symptoms of diseases of that body. Exophthalmus, though infrequent, sometimes occurs, and may be attributed perhaps to a lymphatic stasis in the tissue of the orbit. If there be complete bitemporal hemianopsia, the Wernicke pupillary inaction sign may be demonstrated. The ophthalmoscopic signs are pallor of the optic nerves, with diminution of the blood currents, followed by pronounced simple atrophy. Choked disc occurs in the later stages in a few cases where intracranial tension is much increased. The most instructive changes are in the visual fields. While it was formerly thought that bitemporal hemianopsia was diagnostic, it is now held that scotoma, homonymous hemianopsias and even slight cutting in the temporal fields are of no less significance. Great stress was laid upon the importance of recognizing cutting in the color sense in the upper outer field of vision. Scotomas, paracentral in type, symmetrical in the two eyes or not, are of great significance. The field in one eye is usually much more compromised than in the other. Great variations occur in the field from day to day, according to the changing degree of pressure exerted upon the optic nerves within the brain.

Dr. Posey dwelt upon a diminution of the light sense due to involvement of the axial fibers of the optic nerve, as a symptom of great importance. Homonymous hemianopsia is explained by an extension of the diseased process backwards and the involvement of the tract. Binasal hemianopsia sometimes occurs, but in rare instances, and illustrates how varied

the pressure may be upon the chiasm and optic nerves. Involvement of the motor nerves of the eye occurs, but is infrequent.

The Nervous Symptoms.

Dr. John H. W. Rhein: The symptoms of diseases of the pituitary body are interesting to the neurologist chiefly because this organ is connected with the brain and produces symptoms referable to the nervous system by reason of pressure upon the neighboring parts, rather than for nervous symptoms which disorders of the gland itself may cause. Dr. Rhein divided the symptoms into three groups, namely: hyperpituitarism, hypopituitarism and dyspituitarism. Typical examples of hyperpituitarism or hypopituitarism are rare, one condition overlapping the other, giving rise to a syndrome which is best described as dyspituitarism. Cushing classifies the states of dyspituitarism into five groups, namely: "Group 1—Cases of dyspituitarism in which not only the signs indicating distortion of neighboring structures, but also the symptoms betraying the effects of altered glandular activity, are outspoken. Group 2—Cases in which the neighborhood manifestations are pronounced, but the glandular symptoms are absent or inconspicuous. Group 3—Cases in which neighborhood manifestations are absent or inconspicuous, though glandular symptoms are pronounced and unmistakable. Group 4—Cases in which obvious distant cerebral lesions are accompanied by symptomatic indications of secondary pituitary involvement. Group 5—Cases with a polyglandular syndrome in which the functional disturbances on the part of the hypophysis are merely one and not a predominant feature of a general involvement of the ductless glands."

In a study of one hundred and sixty-nine cases, vertigo was mentioned in ten per cent of the cases. Roth, however, in a statistical study, found vertigo present in about thirty per cent of the cases. Vomiting is a comparatively frequent symptom and occurs in twenty to forty per cent of the reported cases.

The symptoms referable to the visual apparatus briefly consist of disturbances of the field of vision, occasional oculomotor involvement, nystagmus, exophthalmos, ptosis and photophobia.

Other cranial nerve involvement is rare. There are, how-

ever, a few cases on record in which the facial nerve was paralyzed.

It may be said, further, that the increase in the fat deposit is due to deficient posterior lobe secretion. Wakefulness, excitability and irritability point to hyperpituitarism; drowsiness and convulsions, to hypopituitarism. Hyperpituitarism produces gigantism and acromegaly. Hypopituitarism produces adiposity, failure of development and sexual infantilism in childhood, and in adults sexual infantilism of the reversionary type.

The Medical Treatment.

Dr. Wendell Reber: Two years ago (in Scranton) I spoke of a case of pituitary disease that had increased to the point of hemianopsia, and who declined operation. The patient was then put upon thyroid extract and pituitary substance and regained full visual fields. I called attention to the fact at that time that inasmuch as there were certain cases which spontaneously ruptured, it is quite possible that there were others. In view of these facts, it seemed to me wise to exhaust medical measures before resorting to surgical measures. Hirsch reports three in nine cases operated on who died. Waldeck reported a case last year treated by organotherapy, in which full fields had been gained and full visual functions. So that it seems to me it is well worth our while to consider the possibilities of organotherapy.

In the early part of this year I saw a case which at first presented the clinical features of chronic noninflammatory glaucoma. I studied this case very carefully and for a long while. The fields are extremely interesting in that they offer the binasal rather than the bitemporal phase, which would favor the diagnosis of glaucoma. There was a small island in the center of the field of the right eye, in the left eye there was a little central field and then an island. Corrected vision equaled 6/5. There was a saucerizing of the nerve with a slight undermining of the edge of the disc. I finally advised against operation and put him on miotic treatment and elimination. The case was later exhaustively studied by Dr. Weeks of New York, and we both came to the same conclusion—that it was probably a case of mixed picture or disease of the pituitary body.

I feel that we are not simply justified, but absolutely called

upon where the symptoms are not too urgent, to first exhaust medication, including every possible form of organotherapy, before counseling resort to surgery.

Discussion.—Dr. William Zentmayer said that he should like to emphasize the point brought out by Cushing, that homonymous hemianopsia occurs with greater frequency in these cases than is generally supposed. The explanation given by Cushing of the apparent preponderance of bitemporal hemianopsia being that this defect is the one for which cases are referred to those particularly interested in conditions about the hypophysis. Another important point in connection with field defects is that the cases which ultimately become bitemporal hemianopsic often early show symmetrical contraction of the upper outer boundary. Dr. Zentmayer referred to a case in which the deep seated nasal pain was the cause of the case being mistaken for one of intranasal disease. A feature of importance in hypophyseal disease is the fluctuation which occurs in the symptoms. A symptom that he has not here heard touched upon was the early cessation of menstruation. Referring to the rarity of muscular palsies, Dr. Zentmayer stated that in one case he had seen there was a unilateral paresis of accommodation.

Dr. T. B. Holloway stated that, as to the prevalence of exophthalmos in association with pituitary lesions, he had seen one case, and in this the exophthalmos was but slight. Uthoff in his statistics credits exophthalmos with being present in eight per cent of the cases. Lafon has suggested a symptom that has not been mentioned—that is, a recurring congestion of the bulbar conjunctiva—which he is inclined to attribute to associated thyroid trouble, and believes that the congestion is dependent upon vasomotor disturbances. What Dr. Reber has suggested as a possibility had actually occurred in a case that had recently come under his observation. A previous diagnosis of chronic glaucoma had been made, but a study of the case at the time it came under Dr. Holloway's observation, showed field changes characteristic of pituitary body disease, and the X-ray findings, sugar, tolerance, and other phenomena, all pointed unquestionably to the existence of a pituitary lesion. From the appearance of the discs alone the diagnosis of chronic glaucoma was not unjustifiable. He thought it possible that the symptoms of sinus disease might

be superimposed upon the other symptoms, owing to the breaking through of a tumor and the encroachment made upon the adjacent cells. In reference to the field phenomena, this would depend upon the portion of the tract compressed. Dr. Holloway then referred to the relation of the circle of Willis to the visual tract, and referred to the possibility of vascular constriction in tumor of the base and frontal lobes. In several cases he had observed, after operation by Dr. Frazier through the frontoorbital region, an impairment in upward rotation on the operative side, but this promptly subsided, and in no instance had he seen it persist as an enduring symptom.

Meeting of January 14, 1915.

The Symptomatology of Acute and Chronic Retrobulbar Neuritis.

Dr. William Zentmayer: As Dr. Reber has said, retrobulbar neuritis may best be considered under two heads: acute and chronic. It is, however, not accurate to consider the term "chronic retrobulbar neuritis" as synonymous with "toxic amblyopia," as it is now well understood that certain of the agents which produce amblyopia—e. g., methyl alcohol and quinin—exert their toxic influence upon the ganglion cells of the retina, such changes as may be present in the optic nerve probably being secondary. Therefore, we will omit a consideration of these and other drugs which act in this manner.

Dr. Zentmayer detailed the symptoms of the two varieties, and emphasized the fact that the phenomena of the acute did not present the constancy of the chronic type. The differential etiologic diagnosis presented many difficulties. In the acute type the existence of the enlarged blind spot, together with a central scotoma, would indicate a sinusitis. A sudden marked loss of vision, with an early sign of either obstruction to the central retinal circulation or beginning papilledema, would be suggestive of an intravaginal hemorrhage. A similar onset with associated papillitis would indicate an orbital affection. Involvement of one of the ocular muscles with considerable retrobulbar pain would point to periostitis. These points concern only the ocular symptoms. The diagnosis is aided by the history, the results of laboratory tests and roentgenology.

In the chronic retrobulbar neuritis, if the scotoma is abso-

lute and transient, and there is a marked discrepancy between the field findings and the ophthalmoscopic changes, disseminated sclerosis would be indicated. Uthoff holds that a differential diagnosis between tobacco and ethyl alcohol amblyopia cannot be made from the ocular symptoms. However, in the presence of retinal hemorrhages, which occur in some cases, and other signs of retinal angiosclerosis, it is probable that in the mixed toxemia alcohol has been the most important factor.

The question of the relation of arteriosclerosis to tobacco-alcohol amblyopia is of considerable interest. Among those who have especially called attention to it is Scalinci. The age at which amblyopia due to these agents occurs, that there is often a marked difference in the degree of involvement in the two eyes, that blood pressure is often much increased, that there are evidences of widespread arteriosclerosis, are points brought forward by this author. Kruger has found evidences of retinal sclerosis involving principally the macular twigs in most cases. To these findings I would add retinal hemorrhages, which I have found in at least three cases.

As to the explanation of the phenomena of retrobulbar neuritis: Several theories are advanced to explain the nyctalopia, the most plausible being that the production of the visual substance can more readily keep pace with its expenditure in subdued than in bright light. The biologic axiom of Erdinger, "that a high degree of functional activity involves an increased morbidity," has been suggested as the cause of the susceptibility of the papillomacular bundle to toxic agents. A second theory advanced is the poorer supply of blood to the macular region, and a third reason given is that the cones are connected with the polar cells by only one fiber, whereas the rods have several.

It is interesting to note that Ronne's anatomic findings in several cases of tobacco-alcohol amblyopia indicate that the process is a degeneration of the papillomacular bundle, and not an interstitial infection.

The Hereditary Form of Retrobulbar Neuritis (or Leber's Disease).

Dr. William Campbell Posey said that hereditary optic neuritis had first been described by Leber in 1871, whence the

name, often applied, of Leber's disease. The disease manifests itself as a retrobulbar neuritis, usually between the eighteenth and twenty-third years, but may be as early as the fifth or as late as the forty-third year. Both eyes are affected, and loss of sight, which is usually rapid, is dependent upon a central scotoma, the periphery of the field being but rarely involved. While complete blindness has supervened in some cases, the retention of fairly useful vision is general. In the early stages there are signs of a slight neuritis, later atrophy. Cause of disease is unknown. Dr. Posey is inclined to support Berger's view of an anomaly in the development of the sphenoid, but said the proof of this hypothesis was lacking. In the cases of the disease which he had seen, he doubted the neuropathic element which has been claimed by others as a constant factor in their cases.

Dr. Posey referred to two families in which he had studied the disease. The first of these, which was reported by him in 1898, consisted of three males, father, son, and maternal uncle. In all three of these the disease manifested itself at twenty-five years of age, the resultant vision in all equaling about 5/40. Although all three were addicted to tobacco, it would appear that none indulged in it to a degree sufficient, without other factors, to inaugurate the disease. Dr. Posey asserted that the possible influence of tobacco should be always considered in the etiology of an hereditary optic nerve atrophy, for while in all likelihood there are other predisposing agents, it is probable that tobacco may be an exciting cause which originates the disease in many instances.

The second family he studied consisted of the son, aged sixteen, and the father, aged fifty-one years. The disease appeared in both in very early childhood. No other members of the family were affected. Resultant vision in the father was about 5/40 in each eye, in the son 5/35. The father showed characteristic central scotoma; the son, paracentral.

Treatment of Retrobulbar Neuritis.

Dr. T. B. Holloway, in alluding to the treatment of this affection, stated that he thought there were no ocular affections where the symptoms might be more alarming to the patient than in the acute form of this disease. Owing to the

fact that the etiologic factor is often obscure, patients could be better treated if they were placed in an institution where they could be promptly and thoroughly investigated. Owing to the conspicuous rôle that has been assigned to the accessory sinuses in the production of eye disease, we would naturally insist upon a thorough examination of these structures, and, in the event of positive findings, prompt and efficient treatment of the same. The same would apply to investigations of the mouth and pharynx. In fact, eliminative treatment in this disease is essential, whether it is brought about by means of surgical intervention or stimulation of various physiologic functions, such as diaphoresis. For the latter, Dr. Holloway prefers the cabinet bath, although pilocarpin or the older method of blankets and hot water bottles might be resorted to. Mercury and iodids would, of course, be exhibited in those cases where these remedies were especially indicated, but even where such was not the case, inunctions of mercury could well be used, because it was so frequently of service in ocular conditions that were not of specific origin. Sodium salicylate has also proven of service, as has local irritation, sometimes applied behind the ear.

As to the chronic affection, the first thing that would suggest itself would be the immediate removal of the patient from contact with the toxic substance. As far as alcohol and tobacco were concerned, the use of these should be completely stopped, and the patient should be cautioned that one cigar or one drink a day might be sufficient to perpetuate the disease. Owing to the frequency with which the use of these drugs is accompanied by disturbances elsewhere in the body, any coexisting affections must receive attention. In the chronic type, sweats would prove of the greatest service. For its tonic effect strychnin, either by the mouth or hypodermatically, beginning with one-thirtieth of a grain, should be administered.

Dr. Holloway has never had occasion to resort to brucin; neither has he had any experience with thiosinamin. He had used this latter drug some thirteen years ago for conditions other than those existing in the eye, and had never seen the slightest benefit from its use. He has had but little experience with the use of electricity in the treatment of nerve atrophies.

In a recent case, where the high frequency current had been used for a rapidly progressing atrophy occurring in tabes, its use had been disastrous.

W. WALTER WATSON,
Secretary.

WILLS HOSPITAL, OPHTHALMIC SOCIETY.

Meeting of November 10, 1914. Dr. William Zentmayer, chairman.

A Contracted Socket Enlarged by the Method of Maxwell.

Dr. Burton Chance exhibited a contracted socket enlarged by the method of Maxwell, of Dublin. The patient, a woman of fifty-eight years, had had her left eye removed many years after a severe injury. She has been under observation interruptedly for fifteen years. Within the past year she reported, after a lapse of several years, because the socket had contracted so much that no sort of eyeball could be held in place. Two dense, pillar-like bands connected the upper and lower mucous surfaces. These were bisected in the manner devised by Dr. Berens, and this procedure deepened the space somewhat. Six months later an island of tissues from the lower lid was implanted into the socket through an incised space connecting the orbital sulcus with the skin of the lower lid. The socket was thus enlarged to a degree equal to the area of the transplanted skin. A paraffin covered lead plate was inserted and worn continuously. The four sutures from the socket, and the five from the external surface of the lid, were removed on the seventh day. The union of the lid was all that could be wished for. The lid was no longer drawn into the orbit, and a modified glass eye was worn for two weeks, when it had to be removed because a sinus had formed at the anterior line of union of the skin and mucous membrane, through which the discharges burrowed and pointed on the outer surface of the lid. This was healed, and a somewhat larger shell can now be worn. Further operations are intended, to widen the space under the upper lid.

Discussion.—Dr. Zentmayer said that he had done this ingenious operation of Maxwell several times, and always with the happiest results, so far as he had been able to follow the cases. It can, he stated, be done for the restoration of the superior cul-de-sac also. He performed it once for that purpose, but found it more difficult than for the inferior, as one must take care of the tendon of the levator, which is detached by the incision through the lid. A temporary ectropion some-

times results. After operating upon the inferior cul-de-sac, this may be avoided by making the elliptical piece of skin narrower than is usually advised.

Dr. Posey said that he had performed the Maxwell operation in two cases, having been led to adopt it at the instance of Mr. E. Treacher Collins. The deformity was perfectly overcome in each instance. Dr. Posey considered the operation comparatively simple. He also commended the Wiener procedure, but preferred the method of Weeks in all cases in which the socket is contracted ad maximum. He had found the method devised by Berens, that of dividing and utilizing cicatricial bands, of much service in many cases of slight contraction.

Divergent Strabismus.

Dr. Chance exhibited a case showing the result of straightening a widely divergent eye by means of the excision of conjunctivocapsular tissue and the tenotomy of the opposite rectus muscle. The divergence was secondary to a complete tenotomy many years previous to her coming under Dr. Chance's observation. The eye was practically sightless, also, from extensive atrophy of the choroid.

The operative procedures consisted in the excision of an elliptical area of conjunctival and capsular tissues down to the sclera. The tissues were grasped in a quite wide fold within the jaws of a crutchhead-shaped forceps. The surrounding tissues were loosened, and the edges were then united by four sutures. The external rectus was afterwards completely tenotomized. The reaction was but slight, and the sutures were removed on the seventh day. The result was perfect.

Raising of the Upper Lid Associated With Abduction.

Dr. Chance also exhibited a man with paresis of the external rectus muscle. In this case, when efforts at abduction were made, the fissure became much wider through the contraction of the levator.

Diplopia due to paresis of the right externus had come on suddenly three years before. A remission had taken place after a few months, followed by a recurrence a year later, and these symptoms have persisted ever since. The diplopia was homonymous, most pronounced for far-distant objects.

The man, whose age is forty-two years, could read easily at close range. There were no evidences of internal paresis. The fundi were healthy, the visual acuity for each eye equaling $5/7.5$.

The brows had become elevated, which could be verified by comparisons with early photographs. There was an esotropia of ten degrees. Ocular movements of each eye separately were complete, except that outward and upward rotations were slower in the right than in the left eye. When the right globe reached the median line, the upper lid perceptibly uncovered the cornea; and when it reached the outermost limit, the fissure became greatly widened. There was neither ptosis nor retraction of the globe. All the signs have become less since the patient has taken progressive doses of sodium iodid. He assigns the causation of the symptoms to a shocking grief. He has several children, and denies specific infection.

Congenital Aniridia.

Dr. S. D. Risley presented a case of congenital inherited aniridia. The defect had been traced through four generations of an unusually prolific family. In one hundred and seventeen descendants, with two hundred and thirty-four eyes, there were two hundred and seventeen eyes with aniridia. Of the remaining seventeen eyes, two of them were known to have had cataract, and nothing was known concerning the remaining fifteen. In the case presented there was not only aniridia, but also aphakia and detachment of the retina.

O'Connor's Operation.

Dr. Zentmayer presented a man who had no less than thirty degrees of divergent squint in a leucomatous eye. All but about ten degrees had been corrected by the shortening of the internus, with a simple division of the insertion of the externus. Had the eye possessed good vision, the results would have been even better. The good results obtained by this method may, in part, be due to the fact that the central tongue of the tendon is advanced and allowed to become adherent in the exact position to which it is brought, so that all strain is taken off the suture used to advance the tendon by the two shortened lateral tendinous strands.

Detachment of the Retina.

Dr. William C. Posey exhibited a man fifty-three years of age, with double detachment of the retina in hypermetropic eyes, without apparent causal factor. Both retinas were opaque and swollen, and the retinal veins were much engorged. Both discs were obscured by the detachment. Dr. Posey thought it likely that the detachment had resulted from some obscure choroidal disease which further study of the case might disclose.

Syphilitic Neuroretinitis.

Dr. Posey also exhibited a man with severe neuroretinitis from syphilis. Both nerves were moderately swollen; the retinal vessels tortuous and, especially the veins, engorged. There were no hemorrhages or extravasations, both retinas being apparently symmetrically swollen by diffuse infiltration. Vision was reduced to the perception of hand movements at a few inches. Lues had been contracted ten months previously. After energetic treatment with mercurial inunctions, potassium iodid and pilocarpin sweats, vision had risen to 5/100 in each eye. There was a large absolute central scotoma in the right eye, and a paracentral one in the left.

Discussion.—Dr. Schwenk said that in some cases of detachment of doubtful origin, he laid great stress upon transillumination. Not many days before, a man had been sent to him from a distant city for lens extraction. From the expression of the eye, Dr. Schwenk decided to defer the operation, and, as the result of transillumination, the case was diagnosed as a new growth. Upon removing the eye a tumor was found. The cataractous lens was undoubtedly secondary to the growth. In cases in which it is possible to employ it, and in which the diagnosis is undetermined, Dr. Schwenk has found it of great value.

An Elliot Operation With Complications.

Dr. Paul J. Pontius presented a case showing a complication during the Elliot operation. On the 25th of October, 1914, the patient was injured while cutting wood, a splinter of which struck his eye. He came to the hospital one month later, and much of the inflammatory condition was absorbed. The pupil was filled with lens material, and the tension was plus three. He was suffering great pain.

The case was treated for a few days; and, as the tension did not subside, an operation was suggested. The following clinic day an Elliot operation was performed. The dissection of the cornea was commenced and was almost completed, when the patient turned his eye up, and a corneal perforation resulted. The dissection was carried off to the side, and a two millimeter opening through the cornea was established, with a complete iridectomy.

Recovery was good. The man, who had practically no vision, is able now, without the least difficulty, to count fingers and discern objects.

Recurrent Sarcoma of the Orbit.

Dr. Frank Fisher presented a case in which an orbital growth had been removed, together with the eyeball, over three years previously. The microscopic examination at that time showed a round cell sarcoma of small size. There was a rapid reappearance of the growth subsequently, and the whole orbit filled. In July, 1912, this mass was removed, the whole orbit being cleared back to the periosteum, and a mass one-half to one inch in diameter was found at the apex of the orbit. Until February, 1914, there was comparatively little reappearance of the growth. The growth is still there, and rapidly increasing in size, and there is a distinct pulsation throughout the whole mass. Dr. Fisher said that he had refused to remove this growth because at the previous operation he had found that there were arterial and venous anastomoses, the blood coming from vessels almost the size of small lead pencils, and the man nearly dying from secondary hemorrhage. The growth was undoubtedly a sarcoma. Within the last two months Dr. Fisher had applied electrolysis, with good results. It had diminished the pulsation of the mass, and had also diminished the venous congestion.

Proptosis With Sudden Blindness.

Dr. Fisher exhibited a patient who had come to the hospital on October 20, 1914, with proptosis and absolute blindness of the left eye, dating from about the thirteenth of that month. He was admitted to the hospital on October 22d. Ophthalmoscopic examination revealed in the left eye an optic

atrophy which seemed to be the subsidence of an intense neuritis. The man was married, but had no children, and the Wassermann test was positive. On October 29th an incision was made, so as to examine the orbit, with a view of ascertaining whether there was sinus disease or degeneration of the bone anywhere. Further examination of the orbit revealed nothing more than a small mass on the temporal side of the nerve, far back in the orbit, and an apparent increase in the size of the optic nerve. Dr. Fisher put in a drainage pledget, and redressing showed no pus in the orbit. On November 1st the patient complained of some slight difficulty, and on November 2d declared himself blind in the right eye. This continued until the 9th, and on the 10th the man could count fingers at about eighteen inches. The ophthalmoscope revealed a slight congestion of the optic nerve on the right side, but no atrophy, and there was a normal relation between the two sets of blood vessels. The treatment had consisted of mercurial inunctions and iodid of potassium. Either from the relief of tension in the orbit, which had no apparent cause, or from the later use of mercurial inunctions or the iodid of potassium, the patient had been comparatively free from pain. Prior to this he had had pain, neuralgic in character, over the fifth pair of nerves, and intense nocturnal headache. On November 1st the loss of vision was sympathetic in character, and attributed to atropin, which had been instilled; but this progressed until November 2d, when he saw shadows only at six inches.

The X-ray proved negative, and on making an incision into the orbit the bone was found to be normal. That is, there was not sufficient sinus disease to give rise to trouble in the orbit. The presence of the negative X-ray was an interesting feature of the case.

Discussion.—Dr. Zentmayer said that when he had first seen this case, through the kindness of Dr. Fisher, he had been under the impression that it was one of ethmoiditis. The subsequent course of the case and the result of the exploratory operation were against this view. He thought it possible that there was a growth in the anterior lobe of the brain.

Dr. Posey advised a careful X-ray study of the head of the patient.

Stated Meeting, Monday, December 7, 1914. Dr. S. Lewis Ziegler, chairman.

A Case of Epithelioma of the Lid.

Dr. William Campbell Posey showed a case of epithelioma of the lid that was being treated by Dr. S. D. Risley by means of the X-ray. The patient had been previously treated by another physician, who had prescribed a salve. This did not, however, help the condition a great deal. Dr. Posey stated that if he were treating the case, he would operate, cutting out all the diseased tissue and turning in a flap from the temple, even though this operation would probably lead to the loss of the eye, the inferior cul-de-sac having been wiped out, and the growth extending far back.

Report of a Case of Uveitis of Metastatic Gonorrheal Origin.

Dr. Posey then gave the notes of a case of an eye lost from uveitis, probably in consequence of metastatic gonorrhea. Although he had not seen the case at its commencement, he had been informed by the practitioner having the patient in charge that the initial ocular symptoms consisted of a thickening and redness of the pericorneal scleral tissues. Bulbar chemosis soon developed, and a number of small brown ulcers appeared at the corneal limbus. Despite active local and constitutional treatment the cornea rapidly melted away and perforation occurred. Enucleation was demanded. There was a history of a specific urethritis about twenty years previously, followed by various urethral complications and rheumatism affecting most of the joints of the extremities. Antigonorrheal bacterins were used without avail, although a synovitis that appeared at the right knee coincidently with the ocular inflammation yielded rapidly to the injections.

Dr. Posey referred at some length to the ocular manifestations of metastatic gonorrhea, and said that in his practice he had encountered quite a few instances of conjunctivitis from such an origin. He had seen involvement of the cornea in several cases. Gonorrheal rheumatism, too, he considered one of the most frequent causes of iritis. He had usually observed marked improvement in the local symptoms following the use of the bacterins.

Discussion.—Dr. S. Lewis Ziegler asked Dr. Posey whether any microorganisms had been found in the tissues of the eye.

Dr. Posey replied that this had not been tested, the eye having come away piecemeal as soon as he tried to take out the cornea.

A Case of Disciform Keratitis.

Dr. J. Milton Griscom exhibited a case of disciform keratitis. The patient, aged forty-nine years, had first complained of a small spot interfering with his vision, about three months previously. There was no redness of the eye nor pain. Two weeks before coming to the hospital the right eye had become painful and very much inflamed, with marked reduction of vision. On admission to the clinic there was marked ciliary congestion. The cornea showed a central area of whitish infiltrate, three by four millimeters in extent. It was disciform in shape, and located in the superficial layers of the corneal stroma. The infiltrate had a sharply defined margin, and was surrounded by a zone of fine branching lines of infiltrate. The corneal epithelium was somewhat roughened, and there was a central pinhead-sized depressed area, which was covered with epithelium. There had been no material change during the past two weeks of treatment, which had consisted in the local application of atropin, dionin and hot stupes, and the internal administration of an alterative tonic.

Discussion.—Dr. William Zentmayer showed a water color sketch that he had exhibited at a meeting of the College of Physicians two years before. He did not think that the members of the society had ever seen it, and offered it to exemplify some of the points in Dr. Griscom's case—especially the little fine radiating lines, which, he said, had shown very clearly in the dark room. He stated that Fuchs had called attention to these lines, which are believed to be due to wrinkling of Descemet's membrane, and said that the condition had first been described as "cold abscess." Although some experimental work that seemed to bear out this view had been done with vaccine virus, Peters had afterwards come forward with evidence pointing to a neuropathic origin, and Verhoeff had subsequently arrived at the same conclusion. Dr. Zentmayer believed the condition more likely to be microbic in origin.

Transillumination in the Negro Race.

Dr. Griscom read a note on transillumination in the negro race, in which he stated that about three years before, while endeavoring to determine the nature of an intraocular growth in a negro patient under the service of Dr. S. Lewis Ziegler at the Wills Hospital, he had found it impossible to transilluminate any part of the eye under examination. As a means of comparison the opposite eye, which was normal, was tested, and it also was found to be impervious to concentrated light placed over any portion of the globe. Further investigation revealed the fact that the pupillary glow in an eye subjected to the transillumination test was much reduced in the negro race, and in many cases was entirely absent. This reduction in the main was found to be proportionate to the intensity of the skin pigmentation, but this was by no means an invariable rule. The foregoing observation was recorded by Dr. Griscom on account of its medicolegal, as well as its clinical, significance. He stated that the explanation lies in the fact that the uveal pigment, which does not transmit light, is normally more dense in the negro. In his opinion, the blocking of the light rays in persons of that race is entirely physiologic.

Discussion.—Dr. Zentmayer considered this an important clinical observation, which, he thought, should be borne in mind in cases suspected of intraocular growth in the negro race. He asked how many cases Dr. Griscom had tested in order to check up his observation, saying that this test should be made in other cases, so as to determine whether all colored persons show the same negative result to transillumination.

Dr. Griscom replied that after the observation had been made, he had, for about two months, tested every colored person that had come to the clinic. At least one hundred eyes had been tested by him in this work, and he thought that the condition is of fairly regular occurrence. He stated that while the intensity of the illumination is reduced in colored individuals, the result of the test is not always entirely negative. In some cases, however, he said the light rays are entirely cut off.

A Case of Interstitial Keratitis.

Dr. Charles R. Heed exhibited a case of interstitial keratitis. The patient, a young colored woman, showed a very decided vascularization of the cornea, of the salmon patch or Hutchinson type. She had been in Dr. Sweet's clinic since October 23d, so that the condition was of less than two months' duration, the eye having been sore but two days when she came to the clinic. The appearance at that time had been that of a fascicular keratitis. A few vessels in the conjunctiva were congested at the limbus, and then, extending from the limbus three millimeters into the substantia propria of the cornea, there was a gray infiltration, the base of which was triangular in outline. The infiltration was two to three millimeters in size. The condition progressed quite rapidly from that time on. The patient was put under atropin, and a Wassermann examination was made. The test was positive in result. Within ten days' time the infiltration of the cornea took on a yellowish appearance, much like that of a suppurating condition. The vascularization was almost universal in extent, and there appeared the bluish tint of episcleral injection. The patient was admitted to the hospital, and sweats were given her, with injections twice a day for a week. Then she left the hospital. Since that time she has been using injections and local treatment with atropin. The corneal infiltration has cleared up very much. Dr. Heed stated that the patient is twenty-two years of age, and has been married four years. She has had no children, and there is no history of any luetic condition. Five other children in the same family are all healthy and well. When ten years of age her eyes became sore. They remained so, off and on, for two years; but there was no evidence in the right eye of an interstitial trouble.

Discussion.—Dr. Posey inquired whether the patient had Hutchinson's teeth.

Dr. Heed replied in the negative, and stated that there were no signs of hereditary lues. A diagnosis of acquired interstitial disease was made from the fact that one eye alone was involved, that there were no hereditary signs of lues, and that the onset was late.

Stated Meeting, Tuesday Afternoon, January 9, 1915. Dr. William Zentmayer, Chairman.

Epithelioma of the Lid.

Dr. Samuel D. Risley said that the patient had been sent to him three or four weeks previously, when the lower eyelid was drawn strongly downward on account of an epitheliomatous growth, which was thickened and granular. There was coincident involvement of the retrotarsal fold, and very deep involvement of the external canthus. The patient stated that some months before this time he had had a plaster applied to a little growth on his face, which Dr. Risley imagined to be similar to that then present. The person who had applied the plaster had assured the patient that he had taken the growth out entirely; but, as the result, the lid was drawn downward, and great deformity was produced by the scar tissue caused by the plaster treatment.

Dr. Risley induced the patient to have the X-ray applied, which was done with the help of Dr. William M. Sweet, it being then too late to replace the diseased cells with healthy epithelial cells from elsewhere in the body.

The X-ray was applied for three days in succession, this being followed by a rest of three or four days before the procedure was resumed. The patient rapidly grew better. The three or four large islands of rapidly advancing disease disappeared, the whole surface became healthy, and the improvement was steady up to a time when, for some reason that Dr. Risley was unable to explain, the condition began to grow worse. Dr. Sweet then suggested that they might be doing too much and thus causing an inflammatory reaction; so the treatment was stopped for a few days. Then applications of briefer duration were made at more frequent intervals. Since that time the man has steadily improved. During the last week the applications have been made to a more limited area and for a longer period of time, in order to affect the deeper tissues more strongly than could be done by making the application over a larger area for the same length of time. Indeed, the latter could not have been done without injury to the patient, who is now feeling much more comfortable, the deformity having been largely reduced.

Dr. Risley stated that a growth now present on the face, which had not yet assumed a malignant aspect, was, in his opinion, likely to do so. He had formerly advised the patient to let this alone and not do to it anything likely to cause irritation; but he has now advised her to go to Dr. William L. Clark and have this growth removed by means of desiccation, a method that Dr. Risley had himself employed with good results, having removed several epithelial tumors from the eyelid of a lady so completely that one could not tell where they had been. One application, of about two minutes' duration, had been required in the case of each tumor. The growth crumbled down, and the patient broke it off. At the end of a month there was no scar remaining. For about two weeks she could notice a slight change in the color of this area as compared with that of the skin surrounding it, but later one could not tell that the growth had ever been there.

Pulsating Exophthalmos.

Dr. William Campbell Posey showed a case of double pulsating exophthalmos following fracture of the base of the skull, in which the exophthalmos, bruit and other symptoms of the condition had rapidly disappeared after ligation of the right common carotid and resection of the orbital veins. Vision also rose from 1/60 to 6/60 in the right eye, but was unimproved in the left, which was practically blind from optic atrophy. Dr. Posey had exhibited the same case at a previous meeting, prior to operation, and the contrast was most striking.

O'Connor Operation.

Dr. Posey exhibited a boy with alternating convergent strabismus of fifty degrees, upon whom he had recently performed an O'Connor advancement operation in both external rectus muscles. Absolute parallelism had been obtained for eight days following the procedure, but on the eighth day the suture in the left eye had apparently given way, allowing the eye to converge about twenty degrees. Suitable glasses will be prescribed and parallelism obtained by guarded tenotomies of the internal rectus muscles.

Tansley-Hunt Operation.

Dr. Posey also showed the results obtained in a case of traumatic ptosis from the Tansley-Hunt method. The left lid of the patient, a man thirty years of age, had been almost entirely torn away by a hook, and an extensive plastic operation had been necessary in order to coaptate the lips of the wound and restore the lid to its normal condition and position. Dr. Posey chose the Tansley-Hunt procedure, on account of the cicatricial contractions and thickening of the lid resulting from the injury, in preference to any of the other operations for ptosis, as this method permits of the removal of as much superfluous lid tissue as may be deemed necessary, and as elevating the lid by means of a broad flap of skin and subcutaneous tissue avoids the nicer dissection of the underlying aponeurosis, which is a feature of the Bass, Wilder and other methods.

Sclerosing Keratitis.

Dr. Posey also exhibited a woman with a typical active tubercular sclerosing keratitis in one eye and the marks of an old inflammation of similar type in its fellow. When first seen there was a well marked staphyloma of the uvea in the affected eye, the cornea was densely hazed, and vision was reduced to hand movements. Rapid improvement, with subsidence of the staphyloma, followed hypodermic injections of tuberculin, after the method of von Hippel, and locally heat, atropin, dionin and careful bandaging.

Optic Atrophy From Ethmoid Disease.

Dr. Posey also exhibited a young girl, blind in the right eye from optic atrophy in consequence of ethmoid disease, in whom the lower temporal field in the left eye had recently become lost. A careful search is being made to ascertain the cause of the loss of vision in that eye.

The Desiccation Treatment of Epitheliomata and Nevi of the Lids and Canthi.

Dr. William L. Clark said that the devitalization of adventitious growths by desiccation is produced by applying to the growth a sustained degree of heat that is not of sufficient strength to carbonize it, but of just sufficient strength to

dehydrate it, converting the growth into an inert, desiccated mass. A concentrated, specialized electric current of high potential is utilized for this purpose.

Desiccation, in his opinion, possesses the following advantages:

1. Accessible abnormal tissue may be destroyed rapidly and effectively, and the operation is bloodless.

2. It is a method of precision. A small point may be destroyed without infringement upon normal tissue, as may an area of large size and considerable depth; and there is no danger of injuring the sclera.

3. No needle or other instrument is inserted into the growth.

4. The current has an anesthetizing property, which usually renders the application bearable.

5. There is a devitalizing action on cells of less vitality than normal cells somewhat deeper than the desiccated area, the normal cells recovering.

6. There is sterilization, followed by rapid repair.

7. Blood and lymph channels are sealed, which lessens the likelihood of metastasis in cases of malignancy.

8. There is an absence of contracted cicatricial tissue.

In choosing a method for the treatment of epitheliomas, especially those near the eye, said Dr. Clark, the length of time in which there is freedom from recurrence is not the one important point to be considered, and should not be the deciding factor in determining the merit of the method to be employed. After excision of epitheliomas of the lids and canthi, no matter how thoroughly the work appears to have been done, there is a percentage of recurrence. In such cases, if excision is practiced a second or a third time, there is usually unsightly deformity, often with exposure of the eyeball, notwithstanding the best plastic work. This is not true of desiccation, according to Dr. Clark. Should one or several recurrences appear, desiccation may be employed without the deforming results attendant on excision. The objection to the use of radium or the Roentgen ray, caused by the fact that so much time is required to produce the result and by the danger to the eyeball, does not apply to the desiccation method. Accessible tissue may be destroyed by one application, if desired; and Dr. Clark thought that this should always be the aim in cases of malignancy, because it is the keynote of

success. This method being a precise one, a pin-point surface, as well as a large area, may be devitalized to a considerable depth; and there is no contracted cicatricial tissue, as is the case after cauterization or the use of chemical caustics.

Dr. Clark's ideas on this subject are not in accord with those of the men who advocate excision of growths of the lids and canthi. Experience has led him to the conviction that excision is the least desirable method of treating localized epitheliomata. He said that anyone who had ever seen such a growth destroyed by dessication and had observed the results must be impressed with its merits.

J. MILTON GRISCOM,
Secretary.

BOOK REVIEWS.

Glaucoma—A Symposium.

Edited by WILLIS O. NANCE, M. D., Chicago, and WESLEY HAMILTON PECK, M. D., Chicago. Published by the Chicago Medical Book Co., Chicago, 1914. Price, \$1.50.

This is a symposium which was read before the Chicago Ophthalmological Society, November 17, 1913. The separate papers are: Etiology and Classification of Glaucoma, by Edward Jackson, M. D., Denver; Pathology of Glaucoma, by John E. Weeks, M. D., New York City; Concerning Non-surgical Measures for the Reduction of Increased Intraocular Tension, by George Edmund de Schweinitz, M. D., Philadelphia; Trephining for Glaucoma, by Col. Robert H. Elliot, F. R. C. S., Madras; and Operations Other Than Scleral Trephining for the Relief of Glaucoma, by Casey A. Wood, M. D., Chicago. The discussions are by Francis Lane, M. D., Chicago; E. V. L. Brown, M. D., Chicago; Nelson M. Black, M. D., Milwaukee; Frank C. Todd, M. D., Minneapolis; and A. E. Bulson, Jr., M. D., Fort Wayne, respectively.

The subject of glaucoma and its treatment, in which renewed interest and hopes have been excited by the work of Col. Elliot, are in this little book discussed by men of recognized prominence. While not the final word on the subject, it gives in a small compass the present status of the glaucoma problem.

C. L.

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XV.

RETINAL ANGIOSCLEROSIS AND ASSOCIATED LESIONS.*

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The natural development from the treatment of disease to the prevention of disease—from medicine to preventive medicine—is through greater attention to the causes of disease and the earlier recognition of pathologic changes and tendencies. For the infections the recognition, isolation, and study of material causes is the important step. For the degenerations early diagnosis is the essential. Preventive medicine, recognizing and overcoming the army of invading organisms, lengthens life, and makes ever more important those degenerative changes to which all who live long are liable, and which become, therefore, more and more widely operative as causes of disability and death. Chief and typical of such degenerative processes is the condition broadly designated as angiosclerosis.

The saying that "A man is only as old as his arteries" comes to us from an earlier date. But our modern appreciation of the nature, importance and diffusion of angiosclerosis has grown definite and valuable within the last third of a century.

*Read at the ninth annual meeting of the Medical Association of the Southwest, November 10, 1914, at Galveston, Texas.

And it has developed along two distinct lines that still need to be better correlated and thought of together.

The work of Thoma was published chiefly between the years 1880 and 1890; and Councilman's paper on "Relations Between Arterial Disease and Tissue Changes" appeared in 1891. In the main these observers studied the changes occurring in the larger arteries, and their observations of pathologic anatomy were made almost wholly on the dead body. Bregmann's table, showing the relative frequency of arteriosclerosis in the different arteries, mentions no vessels smaller than the radial and coronary arteries. Meanwhile another series of observations regarding angiosclerosis has gone on, made on the living body and dealing with vessels of a different order—the retinal vessels; the largest of which are about one-sixth of a millimeter in diameter, just visible to the unaided eye, while the smallest, one-hundredth of a millimeter in diameter, are barely large enough to permit the passage of a large leucocyte.

Like the hardening of the larger arteries, retinal vascular changes had been observed before. Some of their results, like hemorrhage, were among the first conditions observed with the ophthalmoscope. Heymann noted the retinal changes of albuminuric disease fifty-eight years ago. Liebreich published an accurate picture of them three years later. Yet Jaeger in 1869 gave no plate depicting angiosclerosis; and Gowers (*Medical Ophthalmoscopy*) in 1879 opened his paragraph of five lines on "Diseases of the Vessels" with the statement: "These rarely reveal themselves by retinal signs." In 1901, when de Schweinitz edited the American edition of Haab's *Atlas of Ophthalmoscopy*, he introduced a plate not given in the German edition, showing the changes in the eye-ground in arteriosclerosis.

While in this, as in any other advances in knowledge, beginnings can be traced farther back, it is fair to say that our present appreciation of angiosclerosis in the smaller vessels began with the presentation to the Ophthalmological Society of the United Kingdom by R. Marcus Gunn, of a card specimen entitled "Ophthalmoscopic Evidence of (1) Arterial Changes Associated with Chronic Renal Disease, and (2) of Increased Arterial Tension." No better use can be made of our time than to read in full Mr. Gunn's communication. There is less

than a page of it, and it might serve as a model in that respect, to be more frequently imitated in our scientific communications. Six years later, in the same Transactions, Gunn published a longer systematic paper on the same subject; but the essence of our present knowledge of angiosclerosis is to be found in this first brief communication. He said:

"This patient shows changes in the retinal arteries identical with those seen in another case of chronic albuminuria exhibited at the society this session. The arteries have an exceptionally bright reflex. The central light streak is very distinct and sharp, while the whole surface of the vessel is of a somewhat lighter color than usual. They have in consequence a metallic appearance somewhat like what would be presented by bright copper wire. This condition has been observed in many cases of chronic albuminuria, and in several cases where no albumin was found, but where high arterial tension suggested the probability of changes in the arteries similar to those usually associated with chronic renal disease. The ophthalmoscopic appearance is presumably due to hyalin degeneration of the arterial walls.

"Attention is also directed to the effect produced on the veins by arteries overlying them. Where an artery, even a small twig, passes over a retinal vein, the circulation in the latter is much impeded. In some cases the vein is indistinguishable just at the spot where it is crossed, and is evidently distended for some distance peripherally from this point. There is a liability to the occurrence of hemorrhages from a vein thus distended with blood. The appearance is interpreted as an evidence of high arterial tension."

On July 20, 1893, Dr. Charles Stedman Bull read before the American Ophthalmological Society a paper on "Gouty Retinitis, Chorioretinitis and Neuroretinitis" which, along with other matters, considered the condition now designated, retinal angiosclerosis. It was a much longer paper than Gunn's, but second only to it in importance. Bull said: "The effects of the poison of gout upon the vascular system are generally recognized to be: First, a high blood pressure in the arteries; second, hypertrophy of the left ventricle; third, hard incompressible arteries undergoing atheromatous change." And again: "These general disturbances of nutrition cause not only disease of the arteries, but also of the veins and capillaries.

In the arteries the middle coat is thinned and there is a loss of elasticity by diminution of the resistance which the wall of the vessel opposes to the stretching of the blood pressure. The vessel is stretched in all directions, it widens, and its lengthening leads to tortuosity. The widening of the lumen is followed by a connective tissue deposit in the intima, and this is followed in turn by a number of retrogressive changes, such as fatty degeneration, or calcareous degeneration, or hyalin degeneration. Similar changes occur in the veins. In the capillaries there is an increase in the porosity of the capillary wall and edematous infiltration of the tissue. The important consequences of this so-called angiosclerosis are varicose dilatation of the veins and aneurisms. In the beginning of the process there is a loss of elasticity of the vascular wall, shown in life by a soft, high pulse and pulsation and tortuosity of the arteries, notably of the retina. At this stage there is the greatest danger of rupture of the arteries. Later the vessels, by reason of the deposit of connective tissue in the intima, become firm and rigid."

In the discussion of Bull's paper Dr. Herman Knapp said: "The conditions which Dr. Bull describes are familiar to all of us, and if I could go over this subject without the preconceived idea of gout being its cause, the number of cases would extend into the hundreds." Dr. Henry D. Noyes added: "I agree to the accuracy of the picture in many cases of disease of the fundus"; and Dr. O. F. Wadsworth said: "I think the condition as I understand it from Dr. Bull's description is not an unfamiliar one." The writer commented: "In these cases (and the same is true for the larger group of cases of albuminuric retinitis), the fact which to my mind is most definitely established is, that there are always great vascular changes, arteriosclerosis and phlebosclerosis. Whether these are dependent upon the circulation in the blood of some such substance as uric acid, or upon other influences, is obscure; and we had better keep our minds open on the question of whether or not they are due to gout. As regards the extensive changes in the walls of the vessels, I am satisfied that they are general." In closing the discussion Dr. Bull stated: "I am convinced that the lesion is at the bottom a vascular degeneration."

Note that at this time, although the ophthalmoscopic ap-

pearances in question were sufficiently common and definite enough to have been noted by most observers, they were associated in our minds chiefly with albuminuria and gout. Gunn introduced the new association with high arterial tension, and angiosclerosis in general was then claiming the attention of pathologists and clinicians. Since that time gout, like rheumatism, has been shorn of the wide pathologic domain that older writers had ascribed to it. And with reference to the so-called albuminuric retinitis, we have learned that some of the lesions grouped under that name are really associated with vascular changes more than with renal disease.

All who have had much experience with the ophthalmoscope have seen cases in which the retina showed the vascular changes supposed to belong to renal retinitis, but the urine was found free from albumin or casts; and often indicated fair elimination. It is more in accord with our present knowledge to see in the clinical picture of renal retinitis evidences of two factors; one clearly vascular, the other more obscure, but best designated as toxic. It will tend to clear the subject if we recognize that retinal angiosclerosis may exist with or without serious disease of the kidneys, and that in many cases the condition of the retinal vessels affords a better basis for prognosis regarding life than does the condition of the urine.

THE LESIONS AND SYMPTOMS OF ANGIOSCLEROSIS.

The pathologic anatomy of arteriosclerosis shows infiltration followed by hyalin degeneration, beginning and always most pronounced in the intima, but extending even to the adventitia. Later the vessels may undergo other changes, the endothelium may be lost at one or more points, leading to roughening of the arterial wall and thrombosis; or exudate in the adventitia may become white, by coagulation, or possibly fatty degeneration. In the veins the primary changes are usually found in the adventitia. In both arteries and veins the resistance of the vessel wall may be subnormal, especially at an early stage.

These changes in the vessel walls are easily connected with the ophthalmoscopic symptoms. Take first the narrowing of the arteries. The infiltration of the intima produces narrowing of the lumen of the vessel. What we commonly see and speak of as a retinal artery is merely the blood column in the artery,

the wall being generally invisible; and often remaining so, even when great infiltration has occurred. The narrowed blood column is called a narrowed artery.

The infiltration and narrowing may be comparatively uniform, or much greater at some points than at others. The same vessel may be half the width at one point that it is on either side, yet at all points narrower than the normal. I can recall several cases in which these irregular narrowings were less than half the normal diameter of the vessel; and it seemed remarkable that the areas of retina supplied by such vessels preserved their function anything like so well as they did.

The altered color of the vessels is clearly dependent on the altered transmission of light by the hyalin material with which the wall is thickened. You will note that Gunn originally compared the appearance of the arteries to copper wire. I think this is a much better comparison than to silver wire, the comparison we frequently see used. Burnished copper wire gives a reflex quite as brilliant and quite as white as the reflex from the arteries, while in general color it resembles much more nearly the color of the vessels than does silver.

With regard to the dilatation and tortuosity of the arterial twigs which some observers have emphasized as a sign of arteriosclerosis, I am still in doubt whether this should not be classed as a symptom of retinal inflammation or late toxemia.

The appearances presented when veins are crossed by arteries are among the most striking and characteristic of the signs of retinal angiosclerosis. The artery passing in front of a vein is itself but little altered in appearance. But across the darker background of the vein may be traced faint lines running parallel to the margins of the artery—the arterial walls—that have lost a little of their transparency. Usually this opacity is so little noticeable that without any structure visible to account for it, the course of the vein seems to be interrupted before it reaches the margin of the arterial blood column. Undoubtedly there may be an opacity of the arterial wall capable of concealing the vein, without its being dense enough to clearly reveal itself.

Then, too, altered refraction of the vessel wall may supplement opacity as it does in the crystalline lens in commencing cataract. The "kinking" of the vein is largely due to refrac-

tion. The vein which approaches the artery more or less obliquely seems at the crossing to bend so as to cross more nearly at right angles. It is probable that the index of refraction of the arterial wall that has undergone hyalin change is such as to give the vessel wall the optical effect of a convex cylindrical lens; and the effect of such a cylinder in displacing an oblique line seen through it, so as to make it appear more nearly perpendicular to its axis, is well known.

The apparent narrowing of a vein where it is crossed by an artery may be partly due to the optical conditions under which it is seen. But there is undoubtedly a real narrowing at this point. Mere pressure from a stiffened arterial wall or from heightened arterial tension seems to be a not wholly satisfactory explanation. The vein is pressed into the yielding retina and the vascular choroid, and not against any rigid surface. Even when the vein passes in front of the artery it sometimes shows a very appreciable narrowing, although the yielding vitreous can hardly exert much special pressure to hold the vein against the artery.

Remember this visible narrowing of a retinal vessel is a narrowing of its lumen, not a narrowing of the total width of the vessel. Such a narrowing we know in the artery means merely a thickening of the arterial wall. May it not have a similar significance in a vein? It seems quite probable that the arterial impulse, small as it is, continually hammering away at the vein, its effect exaggerated by the heightened arterial pressure and the rigidity of the wall, may develop a thickening in the venous wall; much as a callous is developed in the skin by repeated pressure upon it, or new connective tissue formed by prolonged irritation.

I incline to think these narrowings are thickenings of the venous wall. They are not unknown in eyes that we must think free from arteriosclerosis, and quite normal. Indeed, it is a nice point to decide whether a few moderate narrowings of the veins at crossings are to be taken as evidence of beginning arteriosclerosis—or as merely normal—as we regard tortuosity of the larger retinal arteries when not accompanied by other evidences of vascular disease. It is like having to decide whether the optic nerve head shows a significant pathologic swelling, or a pallor that is indicative of optic atro-

phy. The normal runs into the abnormal by insensible gradations.

On one point I feel inclined to disagree with Gunn. That is the importance of distention of the vein to the distal side of its crossing of an artery, and the liability of such distention to cause hemorrhage. I have looked for a special liability to hemorrhage in such localities, and have not been able to satisfy myself that it exists. Moreover, although the veins are generally quite irregular in caliber, they sometimes show no such distention to the distal side; and sometimes they appear to be larger a little way from the crossing on the proximal side than they are on the distal.

Bull, in the passage quoted above, also falls into an error when he speaks of the weakening of the vessel walls being liable to cause aneurismal dilatations. From what was known of the connection between atheroma and aneurism in the great arterial trunks, we assumed at first that arteriosclerosis would cause aneurisms in the small vessels of the retina. The fact is that cases of the kind are so rare as to be quite unimportant. I have looked for such aneurisms for twenty-five years, and have not seen an unquestionable case among hundreds of cases that showed distinct evidences of arteriosclerosis. There are very few cases of the kind on record. On the other hand, other diseases of the retinal vessel walls occur that are characterized by many aneurisms, as angiomatosis (von Hippel's disease), and the vascular disease well described by Leber.

Another observation of Bull's, however, is fully confirmed by my own experience and that of others: namely, the greater likelihood of retinal hemorrhage at an early stage of angiosclerosis than later, when the walls have become thickened to resist the intravascular pressure, or the pressure has grown less through rigidity of the large trunks, or through failure in the propulsive power of the heart. Recurring hemorrhage shown at an early stage may quite cease, although the vascular degeneration goes steadily forward to its fatal termination.

One other symptom of angiosclerosis must be mentioned—a dirty brick-red color of the optic disc, due to enlargement of capillary vessels. I have noted this appearance four years before evidence of general circulatory disturbance and renal disease appeared; and two years before there were other

ophthalmoscopic evidences of arteriosclerosis. The difficulty with regard to it is that it grades insensibly into other forms of redness of the optic disc, and only when quite pronounced can it be accepted as significant.

With reference to phlebosclerosis the striking facts are quickly summarized. It is not the intima but the adventitia that is most constantly and extensively involved. Narrowing of the blood column is rarely general, but while limited portions of the veins may be narrowed, much larger parts are dilated, some of the smaller veins being enormously dilated. The blood column is more likely to be more or less modified in color or masked by the opacity of the walls. But this opacity is not often the white, sharply limited opacity occasionally seen hiding the blood column of parts of the arteries. More often it appears as white lines parallel to the vein, or a grayish translucent blanket, obscuring the crimson color of the blood. In the extreme cases of arteriosclerosis I have always found the veins visibly altered. And in cases which come to enucleation on account of glaucoma, it is generally found that both arteries and veins give evidence of a general thrombosis; and it is impossible to determine which suffered first.

GENERAL IMPORTANCE OF THE SUBJECT.

This subject is important in connection with the movement referred to in the opening of this paper. The evidence with regard to vascular disease should be available to every physician who has to treat obscure departures from health; also to every surgeon who has to operate on patients past middle life. The ophthalmoscopic symptoms give the most definite and earliest intimation of vascular degeneration; long before other vascular disturbances, renal lesions, or failing general health will call attention to it. Such early recognition opens the opportunity to determine what influences hasten, and what retard the progress of the degenerative changes. It will carry us toward a better understanding of the etiology and prevention in general, and bring about the assistance of the individual patient, to whom we owe our first duty.

I have now under observation a man of forty-six years, in whom the retinal symptoms of angiosclerosis, discovered over five years ago, led to a complete revolution in the manner of his living. His retinal condition has improved, his general

health remains good, and he seems likely to enjoy many more years of useful business life.

The importance of the ophthalmoscopic examination in making the diagnosis in a case of brain tumor is generally admitted. I see a case of brain tumor perhaps once or twice a year. I see cases of retinal angiosclerosis every week. The choked disc of brain tumor often appears late in the case; and if it were recognized early, only a few cases are capable of material alleviation and only a very few capable of radical cure. It is not my purpose to take up the general treatment of this condition.

Angiosclerosis is an important factor in the decay of bodily powers of a very large proportion of the people who pass middle life. It can very often and very largely be held in check by regimen and medication. A great many of those who suffer from angiosclerosis go to some one for advice with reference to wearing glasses. If every one of them could be submitted to a careful ophthalmoscopic examination by a competent ophthalmologist, the intelligent regulation of the lives of those affected would constitute one of the great triumphs of preventive medicine. This disease comes at the time when age predisposes men to listen to wisdom and lengthen out their remaining years. Though the knowledge of the danger may often come too late, it would often be of great value. Everything we can do to make more general the early recognition of angiosclerosis will bring added luster to the crown of medical science, and added service to our fellowmen.

XVI.

STRABISMUS.*

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"Within the lifetime of a single generation, the treatment of asthenopia, presumably dependent upon faulty ocular conditions, has assumed a complexity not fully comprehended by our immediate predecessors."—Risley, *Ophth. Rec.*, July, 1912.

It is possible that I am carrying coals to Newcastle when I decided to place this paper before the profession, but during many years of observation in this field of ophthalmology two questions have often come to mind for which I can find no solution as I read the literature on this subject. I do not think the true cause of strabismus has been fully explained, nor do I believe the last word has been said, for if I ask what is the true or primal cause of a deviation of the optic axes, that is to say, what abnormal element is found in all cases, I find no answer in our textbooks of today. And again, I ask why squint disappears, in some cases without glasses and in some with glasses. Finally, I would like to ask the question, even though we are urged not to operate until all other methods fail, when should we operate on these cases? Or, to put the question in another way, should we not operate on all cases of squint? That last question is a very broad one, and I fear many will say it is all wrong; but it is a question often in my mind, though I have not yet the courage to urge its advancement.

I am not willing to accept any of the theories that have been advanced during the past twenty years—in fact, since the days

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of Donders' antithesis, which tells us that "hyperopia causes convergent squint, and myopia causes divergent squint," although this was one of the first theories given to me in my early work in ophthalmology. This theory, to my mind, has disappeared long ago, for to say that convergent or divergent squint may be due to many other causes, one from one prominent symptom, and the other from another prominent symptom, seems to me to make the question very complicated and does not answer any of my previous questions. Some eyes converge, some diverge, some have one eye up, the other eye down, and finally some have both eyes up or both eyes down (double squint). All these deviations have been explained in many ways, but they are all abnormal positions of the optic axes, and consequently may we not say they all have the same common cause for the deviation? I believe so, and trust this paper may prove my contention.

To return, then, to what I have said, I ask, why some children squint, and in time the optic axes become parallel and remain so. (We have histories of these cases.) Another child will squint, and with glasses correcting the refraction we have obtained the correct position of the optic axes. About twenty per cent of all cases seem to come under this condition. Finally, another child must have an operation on the ocular muscles, as all procedures which seem to have corrected the deviation in the other children, now fail completely, and the surgeon must decide on an operation after months of trial to correct an abnormality. Again I ask, could not this operation have been decided on at once without this attempt to correct the squint by other means.

All these questions are interesting, and I have endeavored to find the reason or, in other words, the diagnosis between the child who does not need an operation and the one who finally must have it. Now, obviously all these children presented the same inward or outward deviation, generally the left eye turning in about eighty per cent in convergent squint, and the right eye turning outward with the same per cent in divergent squint. Again, nearly all the cases of convergent strabismus are found to be hypermetropic, and we are enthusiastic over each case which seems to have the eyes paralleled with glasses, and say hypermetropia is the cause; yet our next case completely fails with the correction of the hypermetropia. Furthermore, we

may find a loss of fusion force, the antipathy to single vision, and now we have another cause for squint, and so we look for amblyopia, fusion force, accommodation, myopia, etc., to account for the deviation. But at last, when we decide to operate, we have only one condition, the ocular muscles.

Today is the age of progression in all branches of medicine, and our men of initiative are now working along these lines in every condition of the system apart from the normal in which they find, or endeavor to find, some specific cause. That is to say, all disease must be due to some specific micro-organism, which if found and eliminated must remove or cure the disease. Can we not say, then, that any and all abnormal deviations of the optic axes must be due to some specific cause that may be demonstrated in every case? This may be, and often is, complicated by other predisposing conditions that are more pronounced than the primal cause. Granting this, it seems to me one can make the statement that in all cases of squint we have a deep or primal cause, but so complicated that the correction of a predisposing condition may correct a deformity, though the true cause remains the same.

The above proposition is what I purpose to explain in this paper. To find an answer, we must first have a question; and so we ask, what is the ever-present cause of strabismus? and again, why are some cases so quickly corrected by glasses and others, similar in all obvious conditions, demand an operation?

I have studied, considered, and applied the many and various theories which have been advanced since the days of Donders, and I think my work has shown the usual conditions of success. But as the work has proceeded I have seen many cases that seem to prove beyond any doubt that all these theories, even the wonderful one of fusion, must have some underlying cause, and that other writers have based their conclusions on some few successful cases and dismiss the others by a discreet silence. To say that hypermetropia causes squint, and that the next case we see of convergent squint is myopic, seems to me against Donders' theory. Again, one case of squint has perfect binocular vision as soon as we correct the refractive condition; and I have seen a case of congenital amblyopia without squint which had excellent fusion power.

These cases seem to prove the fallacy of the theories of fusion and of amblyopia. Furthermore, we meet cases of

divergent squint with a very evident refraction of hypermetropia. Even though myopia seems to follow divergence, yet it does not predominate in exophoria; hence myopia cannot be the true cause of divergence. These are the conditions that to my mind bring up the perplexing question: Why do children or grown people squint? and that has led me to look for some condition, anatomic, that was and could be proved present in each and every case. I have stated in my earlier writings on this subject that there must be one underlying cause, which may not be sufficiently developed to produce the deviation, unless complicated by these many other causes, now called theories, amid those in which the primal cause is fully developed and in which the correction of all other theories will result in failure until the primal cause is corrected; that is to say, until some operation has been performed. If this is axiomatic, then we may say, as a corollary to that theory, that if an operation must be performed, if that is the final procedure, then the reason for that operation must be the true cause of all cases of strabismus. We are told that the asymmetry of the orbits may cause squint, but we do not change the contour of the orbits when we operate on the ocular muscles and correct the deviation for the rest of the individual's life. Yet, if the asymmetry caused the squint, why does it not return? Furthermore, it has been asserted that all latent squint was due to muscular conditions, but where shall we draw the line between latent squint and fixed squint, so far as these before mentioned complications are concerned? Only the latter condition is obvious; but all the anatomic conditions are the same in both conditions of strabismus.

It seems to me that all these questions may be answered without argument. We must take into consideration all these theories, and not accept any one theory, unless we find that some one condition does exist in all cases of strabismus, and then its correction should produce the desired effect. May I not say that all these other theories are merely contributing causes to one that is ever present. This argument seems to imply that all cases of latent and fixed squint should have an operation. While I have not fully arrived at this conclusion, I am much inclined to think so, for reasons which will be advanced in this paper. If we establish a theory we must prove its existence, and then, applying our correction to that abnormal

condition, will our procedure be a success or a failure? I venture the assertion that all our operations for squint should be successful, but I find these negative questions advanced by Bielschowsky, in an interesting review by R. B. Hird, in the *Ophthalmoscope*, July, 1912, on "Operative Failure of Squint."

He classifies the cases of squint in three groups: First, the fully successful cases, where binocular vision is obtained. This is possible when there is no amblyopia or congenital defect of fusion. Second, a large number of cases only partly successful, cosmetic result good, without binocular vision (generally with amblyopia); and finally, group three, the unsuccessful cases. While the writer may agree with the propositions set forth in these three groups, yet in his personal experience he must doubt the fact of the third group, the unsuccessful cases.

It goes without saying that we do see many cases of strabismus whose history tells us that they have had one or more operations on the ocular muscles, and yet the deviation of the visual lines, or optic axes, still remains; and as Bielschowsky well says, "Faulty operative technic may be the factor." But not "may be"—is it not always so? And may we not state that all cases of strabismus should and can be made successful? I am inclined to take this view, as from my past experiences, I object to the statement, "operative failure of squint"; and if I may be allowed to so state, I would prefer to say operation not a failure, but the operator's judgment was at fault, to produce the failure. To go back to the old antithesis of Donders, and to suppose that hypermetropia causes squint, and to operate with that diction in view, would be very apt to cause "operative failure"; for if the refractive condition causes the strabismus, then why operate on the muscular apparatus? To do this, as I have already stated, seems to me to violate one of the cardinal rules of surgery, for to be successful one must operate on the cause, the *fons et origo*, of the deficiency.

Furthermore, is it rational to assert that hypermetropia causes convergent squint and myopia divergent squint, when we cannot correct these deviations of the optic axes without an operation on the ocular muscles? Unfortunately for the proving of our argument, and perhaps because the eye is not a mechanical or material optical instrument, but rather a part of the brain, we do find certain children in which the deviation seems to disappear under the use of hypermetropic

glasses. I state "seems to disappear," as I am fully assured that the primal cause still remains, as even this temporary correction will not apply to convergent squint in which we have a refraction that is myopic. Hence we must concede that there must be some other condition existing in all cases of strabismus, and that in many cases the hypermetropia is a strongly contributing cause, great enough to produce an overbalance in a case whose true or primal cause is not very pronounced. I shall refer to this later. But to return: if we have failures, let us first inquire what should be considered successful cases. Here I may make the broad statement that all operative cases in which the cosmetic result is all that can be desired are successful, meaning, the operator has attained all that he proposed or could do by his operative work. This may not be ideal, but it is successful surgery, and it is not even essential that we have binocular vision in all our operations. In some cases the fusion power may return in time after the deviation of the optic axes is corrected, particularly in the cases of amblyopia ex anopsia.

When my book on strabismus was issued some years ago, I clearly proposed two distinct classes of strabismus, basing the classification on the operative procedure in each class. As a first class I placed all those cases of squint that presented well-marked congenital amblyopia, and in the second class those cases of squint which presented good vision in the fixing eye and amblyopia ex anopsia in the squinting eye. That is to say, the vision of the squinting eye is reduced, but may be improved by the usual methods after correction of the strabismus.

It is in these cases that we may attain the ideal operative condition of perfect fixation, with true binocular vision. This broad classification may include all cases of squint, though that peculiar condition known as "antipathy to fusion" may sometimes delay the final result. It may be somewhat difficult to draw the line as to when the first class ends and the second class begins, but it has been my past experience that if the vision of the squinting eye is less than 20/200, we do have that visual anomaly of congenital amblyopia. If we find the vision better than 20/100, we have an amblyopia ex anopsia. I have seen the vision decidedly improved in these cases of squint after a suitable operation and the use of glasses. A division

like this may be very arbitrary, but many years of observation have convinced me that it is very nearly correct, and that the exceptions may prove the rule.

Now give each of these classes their special operative procedure, and in all we will correct the deviation of the optic axes, and in some bring about the ideal condition of perfect binocular vision. We can correct the deviation of the optic axes in all cases presenting the condition noted as the first class, but in the final result we must not look for or expect any improvement in the visual acuity, but only a permanent correction of a cosmetic defect. And in the second class if we adopt a procedure which I prefer, we will not only correct a deviation but may restore binocular vision. Granting these assertions are correct, it seems to me that we have two propositions: First, we should not have any failures; and second, we should know what is the proper operative procedure. Now let us briefly consider Bielschowsky's two rules: "Operate only when all other means fail." This may be a good rule to follow, but my experience seems to convince me, as I have already stated, that all cases of squint should have some kind of operative interference, but it must be the "proper operative procedure" and not the usual method too much in vogue at the present day. For to simply cut the muscles (tenotomy) until the squint is corrected will not do. That procedure too often produces a failure to correct, or a very decided impaired motility or even a divergence. This objection covers his second rule, "An unimpaired motility of the eye must be assured afterwards."

Passing now to the cases of latent squint or heterophoria, we have no loss of fusion force in these. Their vision is perfect in each eye; with binocular fixation and under normal conditions they have no diplopia, and yet again, we cannot draw the line between fixed and latent squint when examined in a scientific manner. Objectively it may be simple after the eye has turned in permanently, but before, when we see these cases, with no squint in childhood, a history of continued muscular asthenopia and eventually a fixed squint, the abnormal rotation of the eye has overcome the fusion sense and the squint becomes obvious. For some reason the eyes have lost the power to preserve binocular vision, and one eye turns inward, outward or upward. If this be true, it offers an argument in

favor of the statement just made, that every case of squint, both latent and fixed, if of sufficient degree, should have the proper operative procedure, even though Bielschowsky asserts that operative treatment is not advisable in latent squint, for "what the near vision gains the distant loses"—a statement that can only refer to a tenotomy.

The object of introducing the subject of heterophoria in this paper is for the purpose of showing the close relation of latent and fixed squint; for an objective squint inward which is fully corrected by glasses as regards the visual lines is still a case of esophoria. In other words, the cause remains, though the cosmetic result may be perfect. But the question arises, What about the future? I have just said the esophoria remains, and this child as it takes up the advanced studies of our present school system, will have certain symptoms of muscular asthenopia. I will illustrate with the following, which is taken from my case book:

Miss K. D., aged seven years when first examined, 1896. Periodic squint; second class; onset, second year; hypermetropia, 3.50 D.; vision 20/30 each. No squint with refractive correction. Her power to fuse is very low. In 1905, after five years, fusion better. Fusion much better in 1910. Stereoscopic vision. Duction 20 degrees in, 15 degrees out. This case shows a decided tendency to squint with either eye; some loss of fusion and constant change of glasses as the asthenopia returns. The tropometer shows increased power to turn in by right eye. Would not a shortening of right externus correct the inward tendency?

From this case we may say that the hypermetropia and the loss of fusion was the cause of the strabismus, but we cannot base a theory on one case, and the ever-present imbalance of the rotational power is the true cause, as shown by the tropometer. I am fully convinced that if the outward rotation had been much less, glasses and fusion exercises would not have been of any assistance unless an operation had been performed. Hence in my opinion hypermetropia or fusion defects, per se, are contributing causes of squint, but there must be an imbalance of muscular power to rotate the eyes about their respective center, to cause squint, and that the innervation of the muscles is the simple child of a too active brain.

I will illustrate this by two interesting cases, both with good visual power:

Mr. and Mrs. M. G., ages about thirty-eight years. She had periodic squint since childhood, constant asthenopia. He has fixed squint in right eye, no asthenopia. Rotation: Mrs. G., each eye 55 degrees in (normal), 45 degrees outward (too low); Mr. G., 60 degrees in (too high), 30 degrees outward, right eye, and 35 degrees outward, left eye (very low). As there is less outward rotation in right eye, that eye turns in.

Turning now to the squint of the first class, as I indicated before, I find this illustrative case of convergent squint with right eye turning in, and amblyopia.

D. N., aged sixteen, onset at third year. Right vision 20/200, no glass; left vision 20/20, Hm. + 1 D. Hyperopia + 3 D. Has worn full correction for some time, squint remains the same. Rotation: right eye 60 degrees in, 20 degrees out; left eye 55 degrees in, 20 degrees out. Here we have a decided tendency for inward rotation, increased in the right eye, which is amblyopic and turns inward. A case giving an examination similar to this with such low outward rotation can be corrected only by a proper operative procedure, and glasses will be useless. I may add that after the operation he had perfect fixation. An exactly similar case, Mrs. M. C., first examined in 1901, has the same refraction and the same amblyopia as D. N., vision 20/200, and yet she has no squint, and good fixation.

Now from this case we cannot say hypermetropia or fusion or amblyopia causes squint, yet all these conditions are present. Why does she not have the same squint as D. H.? Let us look at the rotation. The left eye shows 60 degrees in and 40 degrees out. This should indicate convergence excess. But the right eye shows only 50 degrees in and 55 degrees out: in other words, the right eye really shows divergence, and we have no muscular tendency to deviation and no squint. This case is a true case of dextrophoria, pure and simple. In heterophoria or latent squint you will find the same want of outward rotation, though of less degree, and in exophoria the same deficiency of inward rotation showing and demonstrating the necessity for this examination of the ocular power to rotate the eye, and in this way proving the muscular or primal cause of all cases of fixed or latent squint. From my past

experience along these lines, it seems to me that the true or primal cause present in all cases is shown by the loss of power to rotate the eye, which I would place at one hundred per cent.

I would suggest these averages as contributing causes:

Ocular Defect.	Per Cent.
Hypermetropia	75
Amblyopia, congenital	50
Loss of fusion.....	10
Antipathy to single vision.....	5
Other refractive errors.....	10

This table is not for actual comparison of cases, but is drawn from an observation of all my cases of fixed and latent squint.

In concluding this argument I must say that this seems to be a plea for the muscular theory of squint as the true determining cause, complicated and advanced by the contributing causes previously mentioned. In support of that theory I will quote from others who have made a very careful study of heterophoria. Duane would divide these cases into two classes: Class A, a congenital deviation. This must mean an abnormal muscular balance, and applying the remedy to the cause, he advocates operation only. Evidently Class A is muscular. But why one without the other? Class B, acquired from causes active after birth. What causes? Amblyopia, hypermetropia, fusion, etc., yet none of these causes will produce squint, per se; they must have an abnormal muscular balance, with a weak externus. If, then, it becomes a question of what procedure to adopt on our first examination of a case of squint, let us consider the rotation of each eye about its center. If the excursion of the optic axes shows a reasonable degree of outward tendency in convergent squint, then our atropin, fusion and glasses may be of service, though I regret to say the patient may yet suffer from an esophoria, and not an esotrophia. Per contra, if we find a weak outward rotation in the same condition, then our correction of the contributing causes will not correct the squint. We must operate according to the indications of the tropometer, so well stated by Howe of Buffalo—a statement which I shall refer to later. In this connection it has been interesting to me to note that Risley of Philadelphia, in a paper reported in the *Ophthalmic*

Record, July, 1912, says that our insufficiencies of the ocular muscles may be divided into two groups—relative and absolute. The former, or relative conditions, which may be due to accommodative action, does not refer to the present paper, but if we study the action of the group called absolute, we find these words: "They depend upon some anatomic fault, some anomaly in one or more of the extraocular muscles." No more, no less, and in which we may state that the absolute insufficiencies are due to muscular action. Now in this group, if we place all cases of strabismus, and, according to Risley, these absolute cases of strabismus are due to muscular action, then this seems to me to be the muscular theory pure and simple. Furthermore, in the same paper Risley states that in many cases the fault may be "an abnormal attachment of the muscle to the anterior segment of the globe." Very true; but is not this an anatomic fault in the muscles themselves, that is to say, an increased or a decreased power to rotate the eyeball about its center of rotation? Accepting these two anatomic conditions, we must have a change in the power to rotate the eye; a power which can always be fully demonstrated by the study of the findings of the tropometer.

Now we come to the question, what shall we do or how shall we treat these cases of squint? I cannot accept the suggestion of glasses at babyhood, as advised by many writers. This advice to put on glasses when a baby shows a tendency to squint is not fully justified, in my opinion, nor do I think it in any way useful. It is true that our experiences in all these cases may differ, as one's foresight is not always correct; but one's individual experience is useful in many ways, and my own observation has convinced me that, as the true cause of squint never changes, we may have the same success with our glasses, our exercises, our atropin, etc., when the child is old enough to make a correct diagnosis of the refraction, as to try these measures before the child has left its mother's breast.

The statement has been made that squint may be due to any number of causes, and so we try all these various suggestions, hoping to find the cause, and after a few years of futile effort, we tell the mother we must operate; and then guess where and what the operation shall be. One tells us tenotomy; but what muscle shall be tenotomize, or go on cutting until we reduce the inward rotation to a low degree? Another says

advancement: and again we have the question, what and where? Now why all this uncertainty? Cannot the writers tell us where to operate and why? O'Brien said: "Twenty or more years ago, before my studies began, faulty insertion or overaction of the external ocular muscles as the etiologic factor in strabismus had great vogue." However, I object to this statement, for, during thirty years of active work in ophthalmology, and twenty years in one of the largest eye hospitals of New York, I know that the "muscular theory," so-called, was not in vogue in that city. And, furthermore, I want to state that the old theory of Donders' antithesis has always had first place, followed by that of Worth's theory of fusion. But each and all of these theories have so often been proved useless, that I regard them only as a contributing cause. We must go back to an old theory which our present scientific instruments enable us to prove—and that this old theory was correct is shown by our examination of the rotation of the eyes. If then we may say there is a true cause for squint, a condition which is found to be present in each and every case, I would state it first in the words of Dr. L. Howe of Buffalo: "We should ascertain by means of the tropometer a turning is due to the excessive action of the adductors, or insufficient action of the abductors. On that depends not only the diagnosis, but also the answer to the question whether to make a tenotomy or an advancement. Until we do agree in this uniformity of definition we will continue to 'flounder in confusion.'" I fully agree with this statement, for it seems to prove that the true cause of squint must reside in the muscular balance of the eyes, and it seems also suggests to the inquiring mind that weak muscular action associated with any of these contributing causes may produce convergence that may be corrected by glasses, and that excessive muscular action must demand operative interference, and all other means will be useless. Hence a diagnosis of the muscular balance suggests the proper procedure for correcting the contributing cause, or, if necessary, a suitable operation.

Yes, a suitable operation, very true; but how shall we decide this question? Bear this one point always in mind: strabismus of any form—outside of the pathologic cases (any form of paresis)—is due to a deficiency of rotation of the eyeball from

purely anatomic causes, and consequently a strengthening operation is always indicated. Landolt strongly advises an advancement, and I am partly in accord with him; but this operation is quite a formidable one, in which we so alter the anatomic insertion of the distal end of the muscle, that I prefer the well-known operation of shortening the muscle in its long diameter. My own method of doing this operation with the catgut suture has proved very satisfactory, and since I introduced that method in 1895 we have now ten different methods of performing the same operation by as many operators in the United States. This must prove its usefulness. If both externi are deficient in convergent squint, I do a double shortening at once and then use the glasses. If the result is not sufficient to produce good parallel position of the optic axes, I then do a very guarded tenotomy under cocain, until the squinting eye is in its correct position. This procedure applies particularly to squint designated as the second class. In squint of the first class, in which we have a decided amblyopia, and when the tropometer shows a decided rotation inward and a diminished rotation outward, I have always operated on the squinting eye by shortening the externus and completely tenotomizing the internus. This procedure always gives me an excellent cosmetic result. In heterophoria, after a careful examination of the rotation by the tropometer, I have placed the catgut suture in the weak muscle, with continued and very gratifying success.

Let me say, in conclusion, with an operation that is perfectly safe and simple, do not let the words "operate as a last resort" influence you in any way. Decide from your examination that an operation is necessary, and you may be confident of success, and not have to consider "our failures in ocular muscle work."

XVII.

AN OPERATION FOR GLAUCOMA--FILTRATION SECURED BY A LEECH-BITE INCISION.*

FRANK C. TODD, M. D.,

MINNEAPOLIS.

The instrument I herewith present was made two years ago, but had never been shown. It is an instrument for the purpose of securing filtration from the anterior chamber under the conjunctiva for glaucoma, similar to the Elliot operation. My experience with the Elliot trephine operation is limited to fifty-nine cases, but even this experience has led me to believe that there are certain cases in which a lesser operation producing a smaller opening would be better.



Previous to performing the above mentioned operation, I performed several Herbert operations, with which you may be familiar. This consists of making a tongue flap of the sclera which hinges at the corneal margin, filtration occurring through the incision thus produced. This operation is done with the ordinary cataract knife, and is very difficult. Because of its difficulty I have devised this knife, which makes a leech-bite incision, i. e., three lines proceeding from a central point, thus producing three flaps; an incision very difficult to close, as all of you realize, if you have ever attempted to suture such an incision. Yet, while this incision remains open and allows satisfactory filtration under the conjunctiva from the anterior chamber, no scleral tissue is removed, and weakening of the sclera does not take place; so that there is less liability to protrusion of the ciliary body into the opening than where a large opening is made, as with the trephine, and a portion of sclera removed. Any one who has had much experience must have

seen cases in which the ciliary body filled the round opening made, and in which more or less disaster occurred later, because of this accident; a result which is not as likely to take place if the incision is small. Furthermore, in some cases in which a trephine opening is made, a large swelling results, being caused by the presence of aqueous humor underneath a too thin and fragile conjunctiva. It is in such cases that ultimate erosion and weakening of the conjunctiva is to be feared, and the possibility of remote infection exist. Such a bleb of conjunctiva does not occur in the case of an operation made with this leech-bite knife.

In performing the operation with this instrument a conjunctival flap may be dissected up, or the knife may be shoved under the conjunctiva well above the margin of the cornea. The point of the knife may then be slid along between the conjunctiva and sclera until it reaches within two or three millimeters of the cornea, when it should penetrate the sclera and enter the anterior chamber, being as quickly withdrawn. If prolapse occurs, iridectomy is performed.

The operation is very simple and may be very quickly performed. It is not intended to suggest that this operation should take the place of the Elliot trephining operation, which I believe to be an excellent operation, but I am coming to the conclusion that the Elliot is not suitable for all cases, as above suggested, and that the operation herewith presented is, in certain cases, safer. I herewith append a report of a case illustrating these points.

Mrs. L. B., aged sixty-four years, was referred to me May 22, 1913, through Dr. MacLeish of Los Angeles. She had been under his treatment for chronic simple glaucoma, and he advised her to have an operation as soon as she returned home.

May 22, 1913, vision in right eye, counting fingers at one foot. Field small and confined to temporal side. Vision in left eye, 6/18. Field much reduced. Cupping of discs; right eye, 5 D., and left eye, 4 D. Right eye affected for five years; sight gradually growing poor. Left eye, patient had noticed disturbance for two months. Pupils seem dilated.

On May 27, 1913, leech-bite incision was made with the knife described. No prolapse of iris occurred, but iris was accidentally cut at the corneoscleral junction, producing slight iridodialysis and no prolapse. Good surgical recovery.

July 18, 1913, vision in left eye 6/12.

XVIII.

HEREDITARY DEFICIENCY OF THE LIGHT SENSE IN OTHERWISE HEALTHY EYES, WITH REPORT OF A CASE.

H. MAXWELL LANGDON, M. D.,

PHILADELPHIA.

The cases which I report in this paper are two members of a family of five, the father, mother, two daughters and a son. The affected members are the father, N. B., and one daughter, M. N. B. The other daughter and the son I have had opportunity of examining and found them to be possessed of normal light sense. The mother's light sense I have not been able to test, but since she experiences no difficulty in reading, etc., under a very dim illumination, it is probably normal.

The first time I saw M. N. B., the daughter, was in November, 1906, when she came to me for a change of correction of a myopic astigmatism and a beginning presbyopia, she being at that time forty-six. Her refraction was:

O. D., — 0.25 S. \ominus — 1.50 cyl. ax. 100° = 6/5.

O. S., + 0.25 S. \ominus — 2.50 cyl. ax. 75° = 6/5.

The fundi were perfectly healthy, the pupils equal and normal in reaction, and the muscle balance showed orthophoria both vertically and horizontally. At that time no history was given of the desire and need of a bright illumination, the refraction was done with ordinary electric illumination of the test card and the deficient light sense was not suspected.

She was seen again March, 1909, for a change of correction, and there had been a slight increase in her astigmatism.

O. D., w — 0.25 S. \ominus — 2.25 cyl. ax. 100° = 6/5.

O. S., w — 3.25 cyl. ax. 75° = 6/5.

After wearing them three weeks, she reported them as comfortable and vision with them satisfactory.

In July, 1910, she came in with a request from her brother, a physician, that I would measure her visual field, as he be-

lieved she had a scotoma in it, since all her life she was prone to stumble over objects: the evening before, she had, when entering the library, which had been illuminated only by the light from a wood fire, fallen over her sister, who was sitting in a low chair.

I seated her before a window somewhat obliquely and started the perimetric measurement, finding the limits of the form field coinciding exactly with the normal outline until the meridian was reached, across which the shadow of her head fell, when there became evident a cut in the peripheral field of about twenty-five degrees, and then for the first time my suspicions were directed toward her light sense. Changing her position before the window so that the shadow of the head fell in the lower nasal field instead of the lower temporal, I found that the cut in the peripheral field again coincided with the shadow. When she was placed so that no shadow fell on the perimeter, her field was full for form and colors with no scotomata, ring or otherwise; when the illumination of the whole field was lessened, there was concentric contraction for form and colors. The central light sense tested with de Wecker's charts was found to be $4/10$ of normal in right eye and $3/10$ in left eye.

On Henry's photometer she sees light through three opals with right eye and through two opals with left eye. According to Henry's own figures, the decade between 40 to 50 has an average light sense sufficient to perceive light through five opals, so if this be correct, her right eye light sense is but $3/5$ of normal and her left eye but $2/5$.

After explaining what the condition was which caused her trouble in a dim light, she expressed her belief that she has inherited it from her father, who, while not so helpless as she in a subdued illumination, could do no reading or other fine work unless the light was unusually bright for other members of the family.

On examination of the father's eyes, I found them organically sound except for some few striae in the periphery of the cortex of each lens.

O. D., V. w. + 1.50 S. = $6/5$.

O. S., V. w. + 1.50 S. \ominus + 0.25 cyl. ax. 120° = $6/6$ +.

Fields of vision in ordinary light, full for form and colors; in dull light, concentrically contracted, with no scotomata.

ring or otherwise. His light sense on de Wecker's chart was one-half of normal; with Henry's photometer he saw light through three opals with each eye, whereas the normal for over sixty year's of age, according to Henry's findings, is four opals. He had always desired and seemed to need a bright light, he said, even in boyhood.

An attempt to trace this peculiar condition farther back in the family was a useless one, since his mother died at his birth and his father when he was but five years of age, and nothing is known concerning the ocular condition of either.

That deficiency of the light sense might be fleeting or permanent, and if permanent, stationary or progressive, was recognized long before Helmholtz in 1848 invented the ophthalmoscope. With the introduction of this instrument it was found that most of the permanent cases were accompanied by fundus changes, usually those of pigmented retinal degeneration or of syphilitic retinochoroiditis; this type was first described by von Graefe.

Nettleship says the cases which have been reported without fundus changes may be generally divided into two groupings: the first occurring indifferently in either sex, transmission by either sex, and in either hyperopic or myopic eyes; the second always occurring in males, but transmitted by females, and in myopic eyes with usually subnormal corrected vision and varying changes in the fundi. These cases often have nystagmus. It is obviously in the first group that the cases here reported belong, since the condition was transmitted from father to daughter, and the former had hyperopic error, while the latter is myopic.

It was not until 1885 that the first pedigree with ophthalmoscopic examination was reported, though Leber mentions the condition in a paragraph in an article in *Graefc-Sacmisch* in 1887.

The earliest family reports are by Richter in 1828, Cunier in 1838, and by Stivenart in 1847. These, being before the invention of the ophthalmoscope, are open to question, with the exception of Cunier's case of the descendants of one Jean Nougaret, who was born in France in 1637 and died in 1719. In 1831 a conscript descendant of his sought to be excused from military service, claiming he could not see at night. He was put down after a superficial test as a malingerer and made

to perform his duties. Later, he having stated that his father, grandfather and great-grandfather were all similarly affected, the attention of Cunier was called to the case, and he charted a very elaborate genealogy, which has been continued and completed for ten generations by Nettleship. Fifteen of the later descendants were examined ophthalmoscopically, and a uniform normality of fundi found. It seems fair then to believe this is a true case. In the pedigree are included 2,116 individuals, of whom one hundred and thirty-five were affected, seventy-two males and sixty-two females, with one case of unrecorded sex. This pedigree is so monumental that before it all others assume microscopic proportions.

Stivenart's pedigree, in *Annales d'Oculistique* in 1847, included nineteen individuals in four generations, ten being affected.

Sedan in 1885 reported a family of four generations.

Atwool in 1895, in the reports of the *Royal London Ophthalmic Hospital*, published a pedigree of nine individuals in three generations, three males and four females being affected.

Cutler in 1895, in *Archives of Ophthalmology*, reports a family of five generations with only the males affected.

Hudson, in volume I of *The Ophthalmoscope*, in 1893 reported a case in a male, with a brother and mother affected.

Sinclair, in the *Ophthalmic Review*, in 1906 published a pedigree of seven generations with forty-five individuals, seven males being affected and five females.

In 1908 Nettleship, in volume XVII of the *Royal London Ophthalmic Hospital Reports*, includes a pedigree of four generations with nine individuals, three males being affected.

In 1873 Swanzy reported three brothers and two sisters in a family of ten children, neither of the parents being affected—an example of discontinuous descent. And in the same year Fitzgerald reported a brother and sister affected, in a family of five children, with neither parent affected. Each of these reports was in volume I of the *Irish Hospital Gazette*.

In 1895 Cutler reported two such families, and in 1905 Fuchs sent to Nettleship the notes of three families with discontinuous descent which he published.

All of these cases have uniformly good vision and full fields in bright illumination, but a congenital deficiency of the light sense, varying between one-half and one-twentieth of normal

or even lower ; this deficiency not being progressive, but apparently the same at death as at birth. The mothers of children in the family reported by Cunier and Nettleship are said to have anxiously tested their babies' eyes in dull candle light as soon after birth as possible, with some bright object, and could tell whether the child was affected or not by the attention it paid.

In this family no unaffected person ever transmitted the disease, so if it entirely disappeared in a generation of a branch of the family, it never reappeared in that branch.

As to the site of the factor or factors causing the deficiency, only guesses can be hazarded. It reminds one of course of deficiency of color sense, and here, if Edridge-Green be correct, the trouble is in the visual cortex ; on the other hand, the most frequent pathologic conditions producing a subnormal light sense are in the eye itself. It seems fairly certain that the trouble is situated at one or the other extremities of the optic tracts, in either cortex or retina, but which, is a problem. It seems most probable to the writer that the defect is cortical, and that it is a condition similar to that which produces congenital amblyopia for form, and to that which produces the many variations of subnormal color perception.

XIX.

AN ABSCESS OF THE OPTIC NERVE.*

HARRY S. GRADLE, M. D.,

CHICAGO.

Visual disturbances dependent on malignant growths in the accessory sinuses or the nose now form a well-recognized clinical picture and can be diagnosed without great difficulty. The blindness, either relative or absolute, may result from actual pressure of the orbital periosteum on the optic nerve. On the other hand, causes other than pure pressure may be the source of the trouble, as the case here described will show.

J. K., fifty-five years old, was seen in the surgical clinic in Graz in December, 1892, by Professor Elschnig, whom I wish to thank for his kindness in allowing me the use of this material. For over a year he had been suffering from a carcinoma of the right antrum of Highmore, which completely filled the nose. A few days before the ophthalmoscopic examination he became suddenly blind. There was an exophthalmos of about eight to ten millimeters. The pupil was dilated and reacted only consensually and to convergence. Ophthalmoscopically, no pathologic changes could be found. The left eye was normal. About one month later the patient died.

At necropsy the right optic nerve at the base of the skull was found to be thickened as far back as the chiasm. The carcinoma, which in places was suppurating, had broken through into the orbit at the apex and was pressing on the nerve. At the bulbar end the nerve sheaths were swollen into an ampule form, such as is usually seen accompanying choked disc due to intracranial pressure. The remaining intraorbital portion of the nerve was normal. During the dissection the roof of the orbit was lifted away and the entire course of the

*From the German University Eye Clinic in Prague, Prof. Dr. A. Elschnig.

nerve exposed. The intracanalicular portion of the nerve was swollen as much as its bony limitations would allow. Here the dura on the nasal side was involved in the tumor. On endeavoring to separate the nerve from the new growth, the dura burst and there was evacuated a small amount of creamy pus that contained Gram positive diplococci.

Figure 1 is a diagrammatic sketch of the course of the optic nerve from the eyeball to behind the chiasm, the superimposed numbers giving the lengths of the various portions in millimeters. Sections through the nerve, designated by the capital letters, are described in the following paragraphs. The constriction between D and E represents the intracanalicular portion of the nerve.

A. Histologically, the eye in its anterior aspects showed no pathologic changes. The papilla presented a deep physiologic excavation. A conus existed laterally, and on the opposite side of the disc was a supraposition of the retinal pigment with the lamina elastica of the choroid. The perforating scleral vessels were possibly slightly dilated, but there was no infiltration of their walls.

B. The structure of the lamina cribrosa was loose, as was that of the nerve fibers directly behind it. This looseness led to the formation of small empty spaces within the nerve fiber bundles. These were identical with those described by Axenfeld and others in myopic eyes and claimed by them to be similar to the Schnabel "glaucomatous caverns." There is, however, but little similarity between the true glaucomatous and the myopic caverns. This portion of the nerve was poor in glia tissue, but the connective tissue trabeculae were thickened and nuclear-poor. The vessels were slightly thickened and perhaps somewhat fuller than usual, and the arteries showed a moderate degree of arteriosclerosis. The Pal-Weigert stain revealed a slight atrophy of the papillomacular bundle alone, while the rest of the nerve fiber bundles were normal. The picture was that of a simple descending atrophy of the optic nerve at its bulbar end.

C. Farther back toward the beginning of the abscess the picture changed somewhat. The dura was sensibly thickened, while the arachnoid and pia showed but few, if any, abnormalities. The connective tissue septa were markedly thick-

ened, rich in nuclei and compressed the nerve fiber bundles even to the point of obliteration. These bundles were smaller than normal and some of their medullary sheaths were entirely gone. Pal-Weigert stain showed some medullary degeneration products in the papillomacular bundle alone. The vessels were thickened and slightly dilated, but not infiltrated.

D. The front end of the abscess was located centrally in the nerve and was surrounded on all sides by nerve fiber bundles. It presented a broken-down area that increased in size as the sections proceeded posteriorly. This area was filled almost exclusively with mononuclear leucocytes, although some polymorphonuclears were present. A great deal of fibrin and detritus was to be seen. The nerve fiber bundles were pressed to all sides by the abscess and were distinctly smaller than nor-

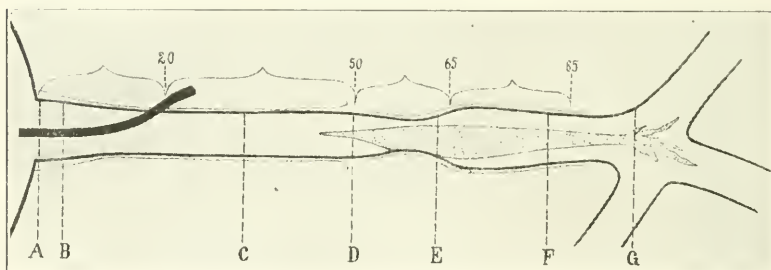


Figure 1.

mal. The medullary sheaths had partially disappeared, and many broken-down products of these sheaths came to view with the Pal-Weigert stain. A few fat granules were to be seen in the periphery.

E. In the central region of the abscess, that is, at the junction of the canalicular and basal portions of the optic nerve, the nerve was markedly thickened. On the nasal side of the canalicular portion the dura had entirely disappeared and the arachnoid and pia were thickened and infiltrated. However, even with special stains, I was unable to detect any organisms in the sheaths or abscessed portions of the nerve. But it must be added that the specimen had been hardened for a long time in Mueller's fluid, which destroys the staining power of the bacteria. Here the abscess extended from the nasal side of

the nerve nearly through to the temporal side with the exception of a small bundle of nerve fibers, crescentic in shape, adherent to the temporal sheaths. In the abscess proper, only leucocytes, fibrin, cell detritus, and degenerated medullary sheaths could be found. The predominating type of leucocyte was the mononuclear. A few fat granule cells became visible with the Pal-Weigert stain. The temporal nerve fiber bundles still present were compressed by the thickened connective

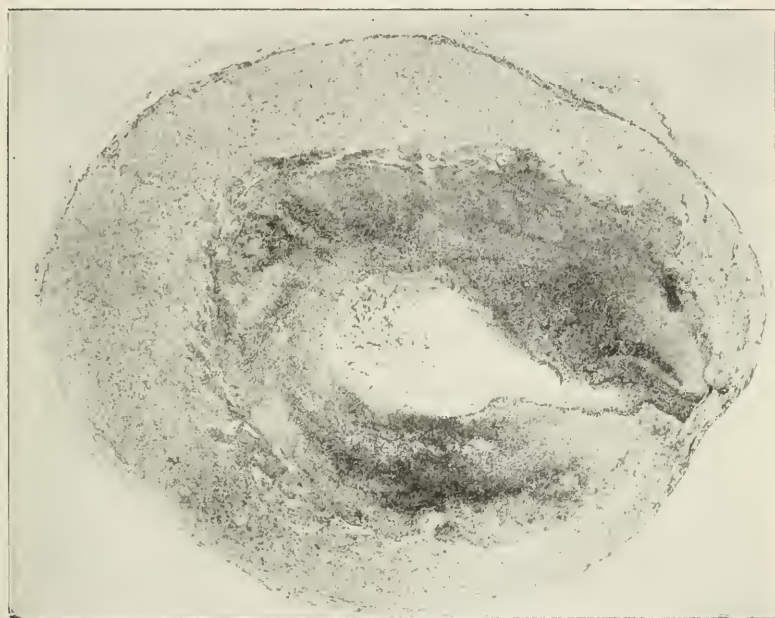


Figure II.

tissue septa, but showed no distinct inflammatory changes. Separating this seminormal area from the abscess was a broad band of fibrin, incompletely encircling the necrosis. This fibrin had also forced its way in between the nerve fiber bundles in various localities. No carcinomatous cells were to be found.

F. More posteriorly the abscess became excentric. Practically the same picture was presented here as toward the front

end of the abscess. The Pal-Weigert stain, however, showed more degenerated nerve fibers here and smaller bundles than anteriorly. The intima of the vessels seemed to be more sclerotic while their walls were thickened and somewhat infiltrated. Around some of the vessels were mononuclear leucocytes in such quantities as almost to form a sheath.

G. Horizontal sections through the chiasm showed the abscess to lie fairly in the center of the nerve. The abscessed area was here rather broad and not sharply circumscribed, in that numerous bypaths could be seen diverging from the main area. The neighboring nerve fiber bundles were compressed and nuclear-poor, as well as fiber-poor. Mononuclear leucocytes were found around the abscess area, forcing their way in between the thickened connective tissue trabeculae. As seen in the schematic diagram, the abscess was not confined to the involved nerve alone, but forced its way through the center of the chiasm along the crossed bundles, so that it impinged on the opposite tract. The abscess came to a sharp point here and ended. Throughout the entire chiasmic area involved the vessels were dilated and their intima was richer in endothelium. They were filled with red and white blood cells, and their walls were to a great extent infiltrated.

We have, then, an abscess of the optic nerve, extending directly from a suppurating carcinoma that filled the nose. The dura was first attacked in the intracanalicular portion and drawn into the abscess, following which the abscess attacked the optic nerve proper. The pus burrowed anteriorly and posteriorly in a conical form. Anteriorly the globe was not reached, while posteriorly there seemed to be less resistance and the abscess involved the chiasm.

Apart from the rare clinical and still rarer histologic findings the case is of interest in that it throws light on the scotomata and blindness secondary to accessory sinus disease. But a glance at the normal anatomy is necessary first. After the central artery and vein leave the nerve, about ten millimeters posterior to the globe, there is a short stretch of nerve without any large central vessels. In this area and posterior to it, small veins run from the surrounding sheaths and nerve fiber bundles toward the center of the nerve, finally uniting to form a small central vein, the *vena nervi optici centralis* pos-

terior. Toward the basal end of the canalicular portion of the nerve this vein assumes a fair size and is fed by venules from the nerve proper, as well as from the nerve sheaths. It finally empties directly into the cavernous sinus. The first anatomic description of this vein was published by Kuhnt, and it was later mentioned in a pathologic connection by Vossius.

In the bony optic canal the ophthalmic artery lies below the nerve and is embedded in the dura, which fulfills the double function of optic nerve sheath and periosteum. The true periosteum lining the orbit blends with the dura at the orbital end of the canal and loses its identity. Hence any infection of the periosteum can pass directly into the dura and thence, through the posterior central vein, into the center of the nerve itself.

Due to this vascular arrangement, the canalicular portion of the optic nerve is peculiarly susceptible to inflammations originating in the dura, either intracanalicular or intraorbital. As the "Kuhnt vein" lies in close proximity to the papillomacular bundle, any inflammatory involvement of the vein would lead primarily to a central scotoma and eventually to blindness. Any infiltration around the vein, with a subsequent destruction of the papillomacular bundle within the canalicular portion of the nerve, would result in a descending degeneration of this bundle. Such a case was reported by Elschnig in his work on "Stauungspapilla."

An important observation in this respect was made by Elschnig in a case of chronic internal hydrocephalus with choked disc. There existed a diffuse meningitis, which included a chronic inflammation of the three sheaths, especially in the intracanalicular portion. Only around the posterior central vein and its accompanying small arteries was a massive lymphocytic infiltration, pressing on the papillomacular bundle. O. Sachs of Innsbruck made a similar observation in a case of intoxication neuritis. The appearance of a central scotoma as an early symptom is thus explained by the histologic findings.

Based on this anatomy and on the reported anatomic findings, we are justified in assuming that the majority of visual troubles, secondary to accessory sinus disease, result from a direct attack on the canalicular portion of the optic nerve or

its sheaths. This may be a simple edema, transient in effect, an infection passing from the periosteum through the sheaths into the nerve, or a direct necrosis, such as was found in this case.

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XX.

THE SIGNIFICANCE OF THE TRANSPARENCY OF THE RETINAL BLOOD COLUMN.

WILLIAM LINTON PHILLIPS, M. D.,

BUFFALO.

It is a well known fact that the retinal blood vessels are transparent and indistinguishable from the retina, but it is not so well known that the blood contained within the vessels is normally opaque. While ophthalmic literature teems with the former fact, it is likewise conspicuous in the absence of the latter fact: although there are numerous references that could be interpreted as confirming or denying the normal condition of the retinal blood column.

Transparency of a blood column means viewing the color of an underlying venous blood column through an overlying arterial blood column, or vice versa. Care must be taken not to place too high a value upon this condition when the vessels cross each other on the optic disc, for here the pale color of the nerve head has a tendency to reflect the light more than the retina and thus cause the column to appear more transparent. The length, breadth, tortuosity and light reflex of the retinal vessels aid us in diagnosing changes of the vascular system and other diseases, so also the transparency of the blood column aids us in diagnosing blood conditions.

Transparency of the blood column is not a common condition to find in the retina; in fact I have been able to find it only twenty times in the last six hundred cases.

In order to ascertain what diagnostic value we could place upon its occurrence, blood examinations were made in all twenty cases. No significant value could be placed upon the corpuscular findings, for they varied in direct proportion to the cause of this condition. But it was noted that in all cases the hemoglobin was below normal; in fact it ranged from thirty per cent to sixty-five per cent in those cases where the

transparency was noticed in blood columns over the retina, and ten per cent higher in those noticed on the optic disc.

The first ten cases were treated with tonics—principally the syrup of the iodid of iron—and kept under observation until the blood column became opaque. Then a second blood examination was made which showed that in some cases the white corpuscles had increased and in others the red, but in every case the hemoglobin was above eighty per cent.

Owing to the various ages of the patients—which ranged from fifteen years to sixty-five years—and to the different causes of the anemia, the duration of the treatment varied. In the other ten cases no examination was made of the blood following the treatment, for they were referred to the general practitioner.

Lack of transparency of the blood column does not necessarily mean a normal condition, for we may have a beginning sclerosis of the vessel wall that will obstruct the view of the columns. On the other hand, a transparency when present, besides indicating a blood disease, means we cannot have a great amount of vessel sclerosis, for an opacity of the vessel wall causes an obstruction to the passage of light waves through the column. Therefore, the transparency of the retinal blood column is of diagnostic value in blood diseases as well as in diagnosing arteriosclerosis. We cannot have an arteriosclerosis and a transparency at the same time.

Wherever bluish white streaks mark the vessel wall in the retina and transparent blood columns exist, I believe we can diagnose between a true sclerosis and a transudation of white corpuscles within the lymph spaces of the adventitia which frequently follow those severe concussions to the eyes in fractured skull and in other causes of retinitis.

Gunn speaks of a transparent blood column caused by the bending of a vein over a sclerosed artery, but this is not due to lack of hemoglobin, as was found in the twenty cases to which this paper refers.

XXI.

TOTT'S OPERATION FOR DACRYOCYSTITIS, WITH THE REPORT OF TWELVE CASES.*

V. L. RAIA, M. D.,

PROVIDENCE.

Chronic dacryocystitis in general begins either as a nasal inflammation which spreads gradually upward, or originates from other affections which directly occlude the end of the nasal duct. The position and direction of the nasal duct is such that by merely opening its obstruction a good drainage from the diseased sac into the nose ought to be obtained. But a permanent dilatation is not easily accomplished. Even when large probes have been passed the canal does not remain open for a long time, and this is due to the deep alterations of the mucous membrane which have already taken place. On the other hand, foreign bodies introduced into the lacrimal apparatus irritate the inner surface and rather tend to prolong than diminish the inflammatory process. Different means for destroying the diseased sac have been recommended in the past, but the extirpation of the sac alone or together with the mucous membrane of the nasal duct has lately given the most satisfactory results. To avoid the epiphora which always remains after removal of the sac, Dr. Toti of Florence, after careful study of the anatomy of the lacrimal apparatus in relation to the nose, recommended, ten years ago, a new operation called by him dacryocystorhinostomy. It consists principally in converting the nose and the lacrimal sac into one common cavity, into which the tears and any abnormal secretion may flow freely. To obtain this the bony partition separating the two cavities must be removed, and the internal wall of the lacrimal sac, with a corresponding piece of the mucous membrane of the nose, must be resected.

*Read before the Rhode Island Ophthalmological and Otological Society, February 11, 1915, with the presentation of five cases.

The different steps of the operation are in brief as follows:

1. A semielliptical incision, reaching the bones underneath, is made with the concavity outward, surrounding the inner corner of the eye, at which level its maximum convexity must be three millimeters in front of the insertion of the inner palpebral ligament.

2. The periosteum is detached from the nasal process of the superior maxillary bone backward to the lacrimal fossa, upward and downward, to the entrance of the nasal canal.

3. The superior maxillary bone with the anterior crista lacrimalis and the lacrimal bone are resected, extending this resection upward and downward as far as the detached periosteum. Chisels of different sizes, straight and curved, and small bone forceps are used for this purpose.

4. The inner or posterior wall of the lacrimal sac, which is recognized by its peculiar slaty color and its continuation with the easily discernible membranous nasal canal, is resected.

5. A piece of mucous membrane of the nose is removed with a sharp knife, of the same size and form as the remaining anterior external wall of the sac by which it must be substituted. This latter, with the opening of the canaliculi, when perfectly united, will constitute a part of the lateral wall of the nose and will be situated in front of the head of the middle turbinate, a region rather spacious in normal conditions and the most favorable for the drainage of the tears and other abnormal secretions.

6. The flap which during the operation has been kept turned outward is replaced and is maintained in its proper position by means of sutures applied in such a way as to include very little of the skin and as much as possible of the deeper tissues.

I have treated thirteen cases of dacryocystitis by this method, but as the last one is of very recent date, one week old, I shall report only twelve.

Case 1.—A girl, ten years of age, was seen the first time in March, 1910, with a swelling in the region of the lacrimal sac of the right side and an abundant mucopurulent discharge from the puncta on pressure. The parents had noticed lachrimation soon after birth. In May of 1913 the patient returned with great swelling of the sac and fistula, and was recommended for admission to the Rhode Island Hospital. Two weeks after dacryocystorhinostomy had been performed, swell-

ing, fistula and all traces of discharge had completely disappeared, and a perfect drainage of tears into the nose had been reestablished. Five months afterward, patient was brought to my office with epiphora and renewed discharge from the inner corner of the eye. While I was trying to find out what to do for the changed conditions she disappeared and I have been unable to see her since.

Case 2.—Man, thirty-four years of age, had been probed several times and was suffering from annoying epiphora and regurgitation of mucus from the puncta. Dacryocystorhinostomy was performed, and two weeks after, when he was discharged from the hospital, a very prominent scar was visible, but epiphora and discharge had completely disappeared. The patient came to see me last month (January, 1915) for a simple disturbance of vision, and I had the opportunity to see that the scar had become hardly perceptible and the cure permanent.

Case 3.—French Canadian woman, thirty-five years of age, was sent to the Rhode Island Hospital from the out patient department. No probes had been used, the sac showed slight dilatation with regurgitation of mucus from the canaliculi and epiphora. The patient was discharged from the hospital two weeks after the operation with a small scar, but with a rather increased swelling in the region of the sac, and pain. I kept her under my observation for about a month and a half, but conditions did not change materially. When I had made up my mind to use a probe through the lower canaliculus the patient disappeared, and I have not been able to see her since (eighteen months ago).

Case 4.—French Canadian woman, twenty-eight years of age, was referred to the hospital from the out patient department for chronic dacryocystitis. Dacryocystorhinostomy was performed with good result, no discharge being present and the scar hardly visible when she left the institution. Since then, eighteen months ago, I have not been able to see her for further examination.

Case 5.—A young man, twenty years of age, had slight swelling of the sac, regurgitation of mucus from the inner corner of the eye, epiphora, and had been treated with probes several times. Toti's operation gave immediate good results, the discharge and epiphora disappearing completely, although

a solution of fluorescein did not pass, after repeated trials, from the conjunctiva into the nose. The patient shortly after having been discharged from the hospital returned to Europe, and from a reliable source I have heard that he is serving in the Italian army, a fact which confirms his permanent cure.

Case 6.—Woman, French Canadian, about fifty years of age, had been suffering from epiphora and discharge from the inner corner of the left eye for the previous two or three years. Before entering the hospital the face, according to the patient, became swollen, red and painful. She was probed three or four times. Dacryocystorhinostomy was easily performed and resulted most satisfactorily. The drainage of the tears through the upper part of the nose became immediately perfect and has kept so ever since (eighteen months after the operation).

Case 7.—Italian woman, thirty-four years of age, was seen the first time at my office in November, 1913, on account of a mucopurulent discharge from the inner corner of the left eye and epiphora. I advised her to empty the tear sac three or four times a day and wash the eye with boric acid solution. No probes were used. In May, 1914, I performed dacryocystorhinostomy, with disappearance in a few days of all discharge and epiphora. At the end of a week, while she was preparing herself to leave the hospital, the lower end of the incision began to swell and a regular abscess formed from which considerable pus came out. The patient was compelled to remain in the hospital two weeks more, but in spite of this the drainage of tears became perfect and has remained so until the present date. The only drawback of this case is a big scar left along the incision which is still visible and looks like a cord.

Case 8.—Mrs. V., thirty-three years of age, in 1911 came to my office complaining of epiphora of the right eye. Probes were used for two months, then she abandoned all kinds of treatment. After two years she came back with an abscess of the sac which was incised. As soon as all symptoms of inflammation had subsided, she entered the hospital in May, 1914, and was operated according to Toti's method. Swelling, discharge and epiphora disappeared in a short time, and when she left the hospital the scar was hardly visible.

Case 9.—Polish woman, thirty-three years old, was sent

from Hope Valley to the Rhode Island Hospital in June, 1914, for an abscess of the right lacrimal sac. Five days afterward, before the swelling of the soft parts had subsided, dacryocystorhinostomy was performed. Little swelling and slight epiphora was still present when the patient left the hospital, about three weeks after her admission. Since August, 1914, I have been unable to see her, and consequently I do not know about the final result.

Case 10.—French Canadian woman, forty-four years of age, of Manville, was sent to the Rhode Island Hospital from the out patient department last June. She had been probed three or four times; discharge was profuse and epiphora very annoying. Dacryocystorhinostomy produced immediately an ideal result. In August, 1914, the patient came to my office complaining of epiphora. After the introduction of a conical probe through the lower canaliculus only once or twice, the drainage of the tears became again normal.

Case 11.—An Italian, about thirty-eight years old, of Woonsocket, was operated for dacryocystitis last June in the Rhode Island Hospital by Toti's method. The conduction of the tears became normal, the abnormal secretion ceased, but a diplopia appeared when the bandage was removed, which greatly upset the patient.

Case 12.—Woman, forty-eight years of age, of Warren, came to my office at the end of last June with great swelling in the region of the sac, and a fistula with epiphora and regurgitation of mucopus from the puncta. Dacryocystorhinostomy was performed the same month, and although the case presented every indication for this operation, according to Dr. Toti's views, no incision of the canaliculi having been made and no probing used, swelling persisted for another month, and lacrimation and discharge of pus for even longer time. At the end of two months I began the systematic use of a special probe through the lower canaliculus, and the discharge gradually diminished until it ceased completely. At present there is only a slight epiphora.

Summing up the results, we find that of the twelve cases, eight were entirely cured at the end of three weeks; two were greatly improved after six weeks; one required a systematic treatment with a special probe for eight weeks, at the end of which period all discharge ceased and epiphora became very slight; and one got decidedly worse. Of the patients declared

cured at their discharge from the hospital, only one returned after a few months with renewed discharge and swelling.

Those who have treated chronic dacryocystitis for many years, and have had the opportunity to compare the different methods of treatment from the old styles and graduated probes to incision, cauterization and extirpation of the sac, cannot fail to appreciate the high percentage of permanent cures and improvements obtained from this new operation. Its technic may be further improved or simplified, but the fundamental principle will always remain the same. I performed the first half of these operations under general anesthesia, the other under local, and I have come to the conclusion that this latter method is to be specially preferred in adults. It is astonishing how satisfactorily it works, considering the thickness of the bones which must be resected and the other delicate tissues which must be excised. It is accomplished by deeply injecting three syringefuls of one cubic centimeter of cocain and adrenalin in three different directions—one horizontally, and the other two from above downward and from below upward, respectively, the point of the needle being directed always under the inner palpebral ligament.

Dr. Toti is of the opinion that whatever are the alterations of the sac, the result is generally good if the canaliculi have not been incised and probes have not been used. My limited experience shows that this is not absolutely true, some of my best cures having been obtained in patients who had been more or less abused with them. It seems to me that the operation is easier to perform in cases where there is slight dilatation or no dilatation at all, even when there is only epiphora or a slight transparent gelatinous discharge from the puncta. In these conditions the sac can be better distinguished, and the absence of infiltration of the surrounding parts greatly facilitates the operation. This is probably destined, when the different steps are more simplified, to be of great benefit even in simple epiphora, whether this be due to beginning obstruction of the lacrimal apparatus or produced by other obscure causes.

Most of the cases have bled profusely, in spite of the adrenalin injected deep into the tissues around the sac according to Toti's direction. Hemorrhage complicates the operation and annoys the operator, obliging him to proceed very slowly and with extreme caution.

FACE POWDER CONJUNCTIVITIS.

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MILWAUKEE.

For several years an occasional case has come under observation in which the train of symptoms complained of have been almost identical, and in which the result of microscopic examination of the secretion from the cul-de-sac has rarely varied.

The patients, invariably women, complain of vision frequently being blurred, inability to use the eyes for any time in the near, severe itching of the lids which frequently is intolerable; the slightest rubbing of lids produces quite marked bulbar hyperemia and only aggravates the itching. In severe cases the lids frequently appear quite edematous from the constant hard rubbing. There is a mucilaginous secretion in varying amounts, which in attempting to remove it pulls out in long strings and is quite elastic. Microscopic examination of the secretion reveals great numbers of epithelial cells in the midst of which or surrounding them are found masses of what appear to be pentagonal shaped crystals, the majority having a central black spot which may be brought out more plainly by slight changes with the fine adjustment. In a few cases there were many fine amorphous crystals disseminated throughout the mass of epithelial cells and pentagonal crystal-like bodies, but these are not constant. Microorganisms are conspicuous by their absence.

Smears taken from these cases have been shown to a number of pathologists, bacteriologists and chemists and the symptoms prescribed, but a satisfactory explanation has never been given. Many suggested that the "crystals" might be secreted by the lacrimal gland, others that they were artifacts.

Last fall slides prepared from secretion taken from the eyes of two sisters having the usual train of symptoms were submitted to Dr. C. H. Bunting, professor of pathology of the University of Wisconsin, who writes:

"After trying various solvents, I found that strong alkalis caused the crystals to swell, become spherical with a doubly contoured wall. When they swelled enough to rupture, iodine showed they discharged soluble starch into the surrounding fluid. So you are dealing with plant cells, probably from some face powder. They are not lycopodium."

After examination of various face and dusting powders Dr. Bunting reported as follows:

"Your 'crystals' come from rice powder. I think they must be the cells that form the hard exterior, but I have not determined that. I have looked over your samples of face powder and rice powder, and find the small amorphous crystals mentioned in your letter in the face powder and not in the rice powder. They do not seem to be organic in nature and are not easily soluble in cold water (if at all), but they seem in a hopeless minority as compared to the rice cells. I am not chemist nor crystallographer enough to tell what they are. They seem so minute, as a rule, in comparison to the size of the rice starch, and so few, I should be inclined to view the latter as the irritating agent."

Upon inquiry, the face powder used was found to have been made by Roger & Gallet. Seven other patients in whom the same symptoms and microscopic conditions were found all used the same make of face powder.

In all probability in applying powder to the face with a puff, a portion of the fine dust is driven upwards and lodges upon the moist conjunctiva. The rice flour in the presence of the tears becomes mucilaginous in character and is not washed from the cul-de-sac, the woody cells of the hard exterior of the rice grain swell and the angular corners produce the conjunctival irritation which is aggravated by rubbing. Those who use a chamois skin in applying the powder are less liable to cause the fine dust to arise, which probably accounts for the condition not being found with every individual using face powder.

The condition is quickly relieved by flushing the cul-de-sac with boric or normal salt solution and the use of an ointment made up of equal parts of lanolin and petrolatum, which seems to cause an agglutination of the cells and allow of their being easily flushed out; one-half per cent yellow oxid salve is usually prescribed. The irritation quickly subsides under a sedative collyrium.

XXIII.

DETACHMENT OF RETINA CURED BY GALVANO- PUNCTURE OF SCLERA, COMBINED WITH SUBCONJUNCTIVAL INJECTION OF MERCURY CYANID.

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CUMBERLAND, MD.

In the summer of 1913 there came to me in a short space of time three typical cases of recent retinal detachment, all totally blind as far as any useful vision was concerned. Having just previously read Vail's pessimistic symposium on retinal detachment, showing about one in five hundred cured, my already weak faith in the efficacy of the various treatments recommended was at a low ebb, and little hope was held out that good would result, whatever was tried in the way of treatment.

The first was in a young man just recently recovered from typhoid fever, and was the prettiest, most symmetrical, balloon shaped I have ever seen. It was suggested we try the injection of sodium citrate, which had the merit of high recommendation and novelty. This was repeated at weekly intervals for a couple of times, with no apparent effect, when between the next treatment the retina seemed to burst and go back into place; the vitreous was full of sheets of black pigment, some sight returned, and hope for the future was entertained. Rightly or wrongly, another injection of the sodium citrate, with mercury cyanid, was given. The sight gradually dwindled away to blindness, the retina being more or less reapplied in folds and rugæ, and covered with the black pigment which settled on it.

The second case was in a high myope of about forty years of age, who had long since been warned of the danger of detachment, and told to report promptly if anything affected the sight. In less than twenty-four hours from time of beginning of trouble the injection of sodium citrate with cyanid

was given. This patient was highly neurotic, and took both the disease and treatment very hard; she remained in bed in a dark room for several days, taking very little food. The result was a total failure.

The third case was in a man of fifty-four years of age. He discovered by chance, one week previously, that he was totally blind, but did not know when the blindness actually occurred. Although it was a beautiful case, I felt so little enthusiasm for treatment that he was advised to let matters be as they were, and he disappeared from observation.

After an interval of three months there came on December 4, 1913, the subject of this paper, Boaz T., aged fifty-four years, blind in one eye for one month; hand movements perceived only in one quadrant of field.

The undilated pupil looked white, and it had been pronounced cataract by a physician in a small town giving special attention to eyes. The same impression was in my mind until the pupil was enlarged, giving a better view, and showing detached retina pushing forward from upper outer quadrant far enough forward to cause the white reflex from oblique illumination. The unfavorable prospect of cure by established methods was explained to patient, and he was asked if he was willing to submit to trial of a new method which had suggested itself to me, but had not been put to actual test. He replied he would, if assured it would not make matters worse.

My idea was that the subretinal fluid should be evacuated by a means that would provide continuous drainage, and excite adhesive inflammation at area of detachment. Accordingly, after long cocaineization of eye by drops, a saturated solution of cocain in adrenalin chlorid, one or two drops, was injected subconjunctivally far back between the superior and external recti muscles, and the bleb massaged until it disappeared to produce a profound and deep anesthesia. The conjunctiva was then grasped by fixation forceps, one prong near the cornea, and the other as far up and out as possible, so that in closing, the peripheral conjunctiva was drawn well inward from its true position. A platinum cautery point was applied cold at a right angle to globe as far back as possible, and current turned on until point burned through to inside of ball. This was attended by a spurting up for one inch or

more of several drops of a greenish yellow fluid. When forceps were released, the hole in conjunctiva was much further out than opening in sclera, so we had a subconjunctival opening in ball, draining out under conjunctiva, and one which could not close for several days. Even after closing, it may probably still be a filtering cicatrix. To guard against any secondary infection, and tone up the physiologic activities of nature's healing processes, a massive subconjunctival injection of cyanid of mercury, with dionin and morphin, was added to the galvanopuncture. These processes were attended by only slight pains, and after remaining in the office, where it was done, less than an hour, the patient left for his boarding house and had no restrictions put on him as to going where he pleased, when he pleased, and as he pleased. The immediate result was that before the eye was tied up, he could count fingers at arm's length. On second day fingers at six feet, and on third day ten feet, measured his progress. He was permitted to go home with no further restriction than to avoid straining or hard physical labor, his occupation being coal mining. He roamed his premises at will, doing such light work as attending to chickens, bees, etc.

On sixteenth day he returned, vision being 10/150 and Jaeger No. 16. He could see objects much better than letters, as there was marked metamorphopsia from unevenness of reattaching retina.

On January 17, 1914, vision equaled 20/150 and Jaeger No. 14. He was put on hydrarg. bichlorid, grain 1/50, and potassium iodid, grains x. three times a day, and permitted to return to work in the mines.

On August 1, 1914, vision equaled 20/100 and Jaeger No. 8, and on November 28th vision equaled 20/75 and Jaeger No. 6 with reading glass. He has had full field of vision all along, and the sight is much better for ordinary use than the relative ratio as expressed by letters would indicate, as the metamorphopsia does not disturb ordinary objects as it does letters.

In response to a letter of inquiry in May, 1915, enclosing a slip of reading test types, he stated he could read the finest print with glasses, and without glasses at a distance he could read what would about represent the equivalent of 20/60 without glasses. As his other eye had a high grade mixed astig-

matism, it is probable that proper lenses would have raised the standard for distance.

Several efforts to induce this patient to return for a final examination were unavailing.* There remained on the upper outer quadrant of the back of the lens a whitish deposit which I suppose to be retinal cells deposited on the overlying hyaloid membrane from long contact.

Following the flood of cases preceding this one came a corresponding drouth, and the only other case in which the treatment was tried was unfavorable to begin with. The patient, being employed in railroad contracting, was obliged to leave this country altogether not very long afterwards, so the final result could not be ascertained. He was a delicate man, about sixty-five years of age, with pulmonary and gastric serious organic diseases. He did not come under observation until his detachment was over six months' duration, and then he had such violent and protracted coughing spells, dyspnea, malnutrition, etc., that it was two months more before we felt justified in doing anything. When the detachment first occurred, he was treated in Pittsburg by injections, presumably salt, and kept in bed from four to six weeks, all to no avail. On burning into his eye, no fluid gushed out: he was given the massive cyanid injection, which was followed by much more severe pain and reaction than usual, causing him to spend a day or two in bed. At times the sight would come for a short while, and he could see a person perfectly clear across the room, and then the sight would lapse back to nothing, as it had been for eight months previous. He returned to the contract railroad job in a few days, and after several weeks I saw him again. His pupil did not readily dilate to the weak mydriatic I felt safe in using at his age, and a satisfactory ophthalmoscopic examination could not be made. He could count fingers ten and fifteen feet at times, and then the sight would leave entirely for a while. He reported that looking at the railroad bed in construction work he could at times see almost perfectly, and then the sight would leave. My explanation was that the retina exhausted very quickly

*Patient returned on June 18th, after paper had been sent for publication. Vision equaled 20/80 and Jaeger No. 3. Near vision almost as good without as with spherical lens, and quite up to standard of other eye with its mixed astigmatism correction. Upper and outer quadrant pupil area still full of dust and haze.

from its long detachment, and if in time it regained its vigor, the sight might remain permanently good.

It is greatly to be regretted that due to breaking up of the camp, the contractors going to parts unknown, this case could not be followed up.

Several textbooks, written in the past third of a century speak of applying an electrocautery point flat externally to the sclera to cause adhesive inflammation, but whether it was practiced, or merely recommended, I do not know. In the symposium of Dr. Vail, if my memory is correct, Mr. Marple said under certain conditions he would not hesitate to apply the cautery to excite adhesive inflammation.

The first reference that came to my notice of any one applying the principle of permanent subconjunctival drainage was a case reported in the spring of 1914, by Tiffany, of Kansas City. He trephined the sclera and snipped out the underlying choroid with scissors. By chance I happened to be in the Manhattan Hospital in April, 1914, and in conversation with Dr. Curtain, learned he was developing a method of treating detachment, but did not ask him to reveal it until published. Being there again in October, it was my privilege to see a case in which a beautiful result had been obtained. His paper, since published, consists of trephining the sclera, and some days subsequently aspirating the fluid subconjunctivally through trephine opening.

At the forthcoming meeting of the American Medical Association, this method will be elaborated by Drs. Thomson and Curtin, and Dr. Parker will have a paper on scleral trephining in detachment, in addition to an article already written by him which I have seen only by title. Likewise we see by titles in ophthalmic literature that Elschmig has been writing on this subject. I still fancied I had something entirely original in the method of making the hole in sclera, and using cyanid injections with dionin in conjunction therewith, until I read in the review of current literature in the *Ophthalmoscope* for May, 1915, that Leslie Paton of London refers to postequatorial galvanopuncture as giving good results in retinal detachment, and in same issue Ramsay of Glasgow speaks of using scleral puncture in connection with cyanid injections. Verily, it is a hard thing to get up something new worth while, and beat the other fellows to it.

XXIV.

A SUCCESSFUL METHOD FOR THE REMOVAL OF A FULLY DISLOCATED (LOST) LENS, HERETOFORE CONSIDERED AND REFERRED TO BY AUTHORITIES AS "IMPOSSIBLE OF EXTRACTION," TOGETHER WITH FIVE OTHER CASES.*

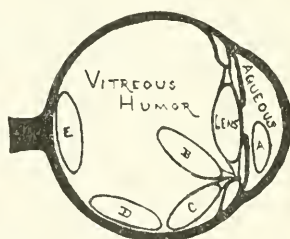
HOWARD S. PAINE, A. M., M. D.,

GLENS FALLS, NEW YORK.

This paper gives the history of:

First. A case where the right lens was partially dislocated into the vitreous, the result of a slight injury. (See C in cut.) Inflammation followed and in six months the eye was totally destroyed. (Case 1.)

Second. The same person with left lens partially dislocated (See B and C in cut), complicated by fulminating glaucoma; removal of lens and complete recovery. (Case 2.)



Third. Case of a lens fully luxated into the anterior chamber (See A in cut); lens extracted with perfect recovery. (Case 3.)

Fourth. Case of Mrs. C. H. T., sister of Miss L. (above), removal of right lens in its capsule, fully dislocated (See D and E in cut) and lying loose in the bottom of the eyeball over the optic nerve when removed. This is the operation Fuchs calls "impossible." Perfect recovery. (Case 4.)

Fifth. Same person as case 4, but the other eye. This lens was dislocated and rested in the eye in a position nearer normal

*Rewritten from a paper read before the Glens Falls Medical and Surgical Society, March 4, 1915.

than B in cut. Lens extracted with perfect recovery. (Case 5.)

Sixth. Case of a lens floating backward, outward and downward in a position between B and C in cut. This lens was extracted. The eye is now clear and in fine condition except a detachment of the retina situated beneath where the lens was lying prior to removal. (Case 6.)

In brief, this paper describes one case with a lens, an infantile cataract, fully luxated into the anterior chamber, two cases of dislocated—hinged—lenses of traumatic origin, and three spontaneous dislocations, one being absolutely free and "lost" in the vitreous.

This paper is intended especially to show how to successfully remove lenses fully dislocated and floating about or lying in the bottom of the vitreous chamber, the kind that up to the present are called "impossible of extraction."

Dislocation of the crystalline lens may be congenital, spontaneous or traumatic.

When luxation of a lens is spontaneous, it is usually the result of pathologic degeneration of the vitreous humor and suspensory ligament. In this variety we are dealing with a "sick eye" and should not expect normal conditions.

Dislocations are partial (where hinged) or complete, and may be forward into the anterior chamber or backward into the posterior or vitreous chamber. A partial dislocation may become complete at any moment.

As the leading writers and operators of the world seem to agree, and since it is generally conceded that the book most employed as a textbook and authority is "Fuchs' Textbook of Ophthalmology," I quote from Prof. Fuchs in full. Quotations are from the third edition, 1908, translated from the eleventh revised German edition with numerous additions by Alexander Duane, M. D., page 464.

"Treatment in those cases in which the dislocation of the lens entails no further injurious consequences besides the disturbance of vision, consists in the prescribing of suitable glasses. In those cases in which the symptoms of iridocyclitis or of secondary glaucoma are caused by the displacement of the lens, extraction of the latter, if feasible, is indicated. Extraction is most readily performed in luxation of the lens into the anterior chamber: in this case, too, it is absolutely re-

quired, since otherwise the eye is lost. In subluxation, the removal of the lens is often difficult or even miscarries altogether, because prolapse of the vitreous occurs on account of the defective structure of the zonula."

"Discission of a subluxated lens may be tried, but it is not often successful, because the lens, being imperfectly attached, gives way before the discission needle. The extraction of a lens floating in the vitreous is impossible. In cases in which the removal of the lens is difficult or impossible, all we can do is to combat the inflammation or the increase in tension by means of an iridectomy. If an eye which is already blind is the seat of inflammation and pain due to luxation of the lens, enucleation is the best means of relieving pain and averting the danger of sympathetic affection of the other eye."

Since Dr. Alexander Duane, the translator of the above, is surgeon to the Ophthalmic and Aural Institute, New York, and as he makes no objection to the above positive statements, it would appear that up to 1908, lenses fully luxated (lost) into the vitreous were evidently considered quite hopeless throughout Europe and America.

Duane adds a note, page 465, to the effect that a lens can sometimes be brought into the anterior chamber, by bending forward or shaking the head. "If in such a case we were obliged to extract the lens, we would first bring it into the anterior chamber by the appropriate maneuver."

Let us quote from "Ophthalmic Surgery," 1913, a later work than Fuchs', "being a handbook of the surgical operations on the eyeball and its appendages as practiced at the Clinic of Prof. Fuchs," written by his first assistant, Dr. Josef Meller, "and translated by Dr. William M. Sweet, of Philadelphia."

Statements in this book would appear to be the last word in Europe. Page 169: "During the cataract operation * * * the lens may be displaced into the vitreous chamber, either spontaneously or through the unskillful manipulation of the operator. Any attempt to recover it is useless and results only in further injury to the eye. The operation has to be stopped and the eye bandaged. Iridocyclitis often follows." Page 221: "Operation should not be undertaken in luxation or subluxation of the lens (except luxation into the

anterior chamber) unless rendered necessary by an increase of tension."

Iridectomy is undoubtedly meant, as nothing about removing or attempting to remove the lens is mentioned, and Fuchs advises iridectomy. See above.

Torok and Grout, in their "Surgery of the Eye," state: "If the lens disappears into the vitreous and cannot be seen, it is better to stop the operation and bandage the eye. In some cases the lens returns to its normal position in a few days, when another attempt at extraction can be made, which, however, is usually attended with considerable loss of vitreous."

The statement of Meller, that "any attempt to remove a lens lost into the vitreous is useless and results only in further injury to the eye," and the advice of Torok and Grout, to make another attempt in a few days, should the lens return to its normal position, are most unfortunate teaching for students of these textbooks.

Healthy vitreous is much easier to deal with than the fluid kind. Lenses, dislocated into healthy eyes, during cataract operations, with or without their capsules, if the patients are reasonably docile and intelligent, should be removed at once and the eyes saved.

Should the dislocation be complete, and the lens disappear into the depths of the vitreous, it need not cause any especial concern to the operator, since illuminating the eye, as hereafter described, will reveal the lens and render its removal from any part of the vitreous chamber comparatively simple.

Let me quote briefly from some other authorities:

Wells, "A Treatise on Diseases of the Eye," third American edition, with copious additions by Ch. Stedman Bull, of New York, 1880, page 355, says: "If the lens is completely dislocated into the vitreous humor and is setting up no disturbance, it is wiser not to interfere. But if inflammatory complications arise, or the sight is much impaired by the lens floating about across the pupil when the eye is moved (partial dislocation), it will be best to remove it, by an iridectomy and Critchett's scoop. The operation is often very dangerous, and severe iridochoroiditis, with subsequent atrophy of the globe, may supervene."

If luxated into the anterior chamber, Wells advises to get it through the pupil into the vitreous, and keep it there. If

impossible, he advises absorbing by needling or removal, i. e., from the anterior chamber.

Von Graefe, quoted by Wells, recommends iridectomy, only, when glaucoma arises.

Noyes, "Diseases of the Eye," 1881, page 231: "When in the anterior chamber, the lens should be extracted. * * * There is much liability to loss of vitreous. * * * Total dislocation into the vitreous had better be left untouched. It is the common event of partial dislocations that the lens becomes opaque, and the loss of sight demands an operation, provided it does not lie in the depth of the vitreous."

Juler, "Ophthalmic Science and Practice," 1884, page 301: "When the dislocation is complete, the lens is useless, * * * hence its removal should be undertaken when this can be done without much risk. The removal of the lens is especially indicated in cases in which inflammatory symptoms have already appeared. Unfortunately, the removal of the lens from the vitreous involves so great a loss of that fluid, while the difficulty in extracting the lens is so great, that the operation can hardly be said at present to come within the sphere of practical surgery, and it is better in such cases to enucleate the eye."

De Wecker and Masselon, "Manuel d'Ophthalmologie," 1889, page 465 (liberally translated), say: "If the lens prolapses into the anterior chamber, try by succussions of head to get it into the vitreous, and by eserine or pilocarpin to keep it there, if glaucoma or other symptoms persist, and it is in the anterior chamber, it should be extracted." They advise not to attempt to remove a lens luxated into the vitreous.

Carter and Frost, "Ophthalmic Surgery," 1889, page 374: "A lens dislocated into the anterior chamber should always be removed. It may lie quietly in the vitreous for years. * * * It more often sinks down, and resting on the ciliary processes sets up destructive cyclitis." Nothing said about removal.

Nettleship, "The Diseases of the Eye," fifth edition, 1890, page 181: "Dislocated lenses are likely, sooner or later, to set up irritation and pain." Nothing said about operating.

Fox, "Diseases of the Eye," 1894, page 300: "In partial displacement without marked disturbance of vision, operative interference is contraindicated. Glasses should be prescribed.

* * * Since removal of the lens from the vitreous is a dangerous procedure, it is preferable to allow it to remain.
 * * * If the lens is floating in the vitreous, the following procedure may prove successful: The pupil of the injured eye is dilated and the patient made to lie on his face for several hours in the hope that the lens may gravitate through the pupil, if it does, the pupil is then contracted, from which position it can readily be extracted. * * * The author (Dr. Fox) has succeeded in removing two lenses in this way."

McBride, "Diseases of the Eye," 1897, page 191: "Dislocation into the anterior chamber * * * demands removal at once. * * * Slight luxation had best be left alone unless the lens becomes opaque, then treat them as cataracts. Nothing can be done for a lens dislocated into the vitreous. * * * Sooner or later it will produce blindness."

Norris and Oliver, "System of Diseases of the Eye," Vol. 3, page 697, of the section edited by Gruening, 1900: "If the presence of the lens in the vitreous does not produce any irritation, it is unnecessary to attempt extraction. * * * If a lens in the anterior chamber causes irritation, removal is indicated. The question of extracting a lens dislocated into the vitreous presents itself when glaucomatous tension or reactive inflammation has followed its presence. * * * On making our incision, if the lens does not present, it is inadvisable to attempt any manipulation for its removal * * * and there is little to be gained by attempting to extract an invisible lens."

Ball, "Modern Ophthalmology," 1913, page 470: "A dislocation into the vitreous, if recent, may offer a good prognosis, provided the surgeon can succeed in getting the lens into the anterior part of the eye, from which it can be extracted. An old dislocation, with a fluid humor, offers little encouragement. If it is situated in the vitreous chamber, attempts to remove it are not justifiable, unless its position can be changed."
 * * * That is, patient to lie face down, succussion, etc., employed as suggested by Fox (above) and lens brought into the anterior chamber, and then removed.

To sum up: The authorities of Europe and America that I have quoted appear to agree that:

First. Slight or partial dislocations are to be left alone and patient fitted with glasses, even though the lenses may com-

pletely luxate at any moment and eventually destroy the eye.

Second. If dislocation is complete in the anterior chamber, get the lens into the vitreous or remove it either with or without fixation by a needle.

Third. If a partially dislocated (hinged) lens is in the vitreous chamber, and either becomes opaque (cataractous) or is causing glaucomatous symptoms, perform an iridectomy. As such lenses usually float up into the pupil, remove them with a spoon.

Fourth. When a lens is not hinged, but freely moving about in the vitreous, settling down and lying in the lowest part of the eye, according to the position of the patient's head, there are several suggestions to consider:

a. Let it alone if it is quiet.

b. Perform an iridectomy when it causes trouble, and it certainly will sooner or later. Smith, of India, says, page 23: "An average of four years 'useful day vision' in the most successful cases (of couching) would be about the outside we could expect." Blindness advances *pari passu* with the disintegration of the lens.

c. Try to get the lens into the anterior chamber and then remove it.

d. When an eye has become inflamed, if the lens won't float up so it can be brought into the anterior chamber by succussion, etc., then enucleate the eye or first poke around in the vitreous with the forlorn hope, but no expectation, of either spearing or scooping it out of the depths of its dark, elusive hiding place.

The failure to extract these lenses is because:

First. The pupil and contents of the globe, being inky black, are invisible to the operator. As Gruening says in Norris and Oliver, as quoted above: "There is little to be gained by attempting to extract an invisible lens." Often these lenses are perfectly clear, and without illuminating the interior of an eye, one might as well try to examine the inside of a barrel by looking through the black bung-hole.

Second. These eyes are extremely dangerous to operate on. A lens never luxates spontaneously in a sound eye. These eyes are "sick eyes." The fluids and tissues and often tension are abnormal, and a lens knocking about in an eye, resting first here and then there, necessarily irritates the delicate internal

structures of the globe, churns up the vitreous, and as the brilliant von Graefe, quoted by Soelberg Wells, truly remarks: "The removal of the lens, with the free communication between the anterior chamber and vitreous space, is apt to prove especially dangerous, as it is impossible to prevent a great escape of vitreous humor." I may add that collapse of the globe is quite likely to occur. This is largely due, because

Third. Any eye speculum used for the performance of Daviel's (the usual) cataract operation invariably causes the tissues and contents of the globe to bulge forward when and after the first incision has been completed. When the lens is luxated the contents of both chambers move toward the opening. It is easy at this point to have the eye run out.

Case 1.—November 9, 1903. Miss Mary L. L., aged fifty-one years. Two weeks previously the right eye had been struck by a foreign particle while shaking a mat and was much inflamed. The ophthalmoscope revealed the right lens luxated backward, hinged at the bottom, and showing below the level of the lower border of the dilated iris. (See C in cut.) I read the authorities to her and, following their writings, advised using atropin locally, iodides internally and watching for tension; also had her consult another specialist, who agreed with my advice.

January 14, 1904. Vision steadily failing. Tension below normal.

February 8, 1904. Vision gone, eye soft, tension minus five. In six months a healthy eye had the lens dislocated into the vitreous, inflammation resulted, and after severe pain, mental anguish and expense, a useless and perhaps dangerous eye resulted.

I read and thought about that case continually.

The reasons why I did not operate in 1903 and try to remove the lens, are:

First. The authorities either gave no encouragement or were opposed to it, and are yet when in the position of C in cut.

Second. The eye had been two weeks actively suffering from iridocyclitis, and was in a bad condition when I first saw it.

Third. I had seen the operation for partially luxated lenses performed four times while attending eye clinics in Paris and

London. Three were total losses. I never learned results in the fourth. These were all traumatic cases and the eyes were otherwise injured.

Fourth. In case of an unsuccessful operation, and legal proceedings, with the medical authorities against me and the amount of bad advertising, whether a suit occurred or not, it would take a long time to ever regain the confidence of that family and their neighbors and friends.

Fifth. I did not want the mental strain and anxiety of such an operation, unless there was some sort of reasonable outlook.

Case 2.—June 10, 1909. For some cause the lens of the left eye of Miss Mary L. L. became detached at top and nasal side. (See B in cut.) Following the authorities, as the eye was quiet, I advised against an operation until some symptom of irritation appeared. It was an anxious time, since one eye had already gone. I will never forget December 29, 1909. Miss L. telephoned me that "something had happened to the eye during the previous night." Pain was intense, nausea persistent, vomiting frequent and the poor woman arrived at my office about 7:30 p. m., with the lens dislocated back and down. (See C in cut.) The globe was very hard, and she could distinguish only hazy, yellowish outlines. Fulminating glaucoma won't wait for doctors, so I arranged a white, ground glass electric light bulb near the patient's head and with a hand condenser had a fine illumination of the eye while making the incision and broad iridectomy. The eye was illuminated inside so I could look down into its depths, see the lens and by slipping a Knapp's loop behind it, lift it out. The eye recovered nicely and patient went home.

April 8, 1910. The optometer showed an eye with the enormous amount of 25 diopters, axis 90, against the rule. This ectasia was due to the glaucomatous pressure distending the new cicatricial tissue of the wound while healing. Prescribed for distance $+ 8 \text{ D} + 12 \text{ axis } 180$. This glass gave 1/10 distant vision. Six years after the right eye went into hopeless darkness; the left came into light.

October 25, 1910. Ten months after operating, changed glasses. Patient now read 20/40 (one-half vision) for the distance and could read the newspaper.

June 19, 1911. A year and a half after operating, patient read in the distance —20/20, or half the letters in the bottom

row of letters, and for near vision, diamond type with ease. This eye was saved:

First. By having the eye speculum gently lifted, the branches thus raised the lids so that the tissues of the eyeball settled back and the contents instead of bulging forward or pouring out, remained quietly where they belonged.

Second. The interior of the eye was illuminated all the time I was operating. The position of the lens was never for one moment in doubt. I do not remember the name of the eye speculum I always employed then, and usually now. It is made by Weiss & Son, and the only pattern used for years at the Royal Ophthalmic Hospital, Moorfields, London. The branches are curved to fit close to the temple and so long that an assistant can easily elevate the lids with them, and thus remove tension from the globe, without getting his hand in the operator's way.

Case 3.—October 23, 1910. Ten months after operating on Miss L.'s eye, through the courtesy of the late Dr. Infield, Mr. Walter O. C., aged twenty-five years, was referred to me with a congenital cataract that had suddenly dislocated forward through the pupil into the anterior chamber. (See A in cut.) For the sake of good illumination, the operation was performed at night, using the same twenty-candle electric lamp with a very cork-screw filament and ground glass globe (to diffuse the light), as well as the same three-inch lens, three-inch focus. The operation was performed at the patient's home. A lead wire was brought from next door, a kindly neighbor held the light and condenser, while the doctor, a general practitioner, without training in eye work, held the speculum, lifting the lids, so that no pressure rested on the eyeball. The lens was removed with the same Knapp loop. Recovery was speedy and uneventful.

In 1913, I obtained a work entitled "The Treatment of Cataract," by Lt. Col. Henry Smith, of the Indian medical service of Amritsar, Punjab, India. This book was a new departure and a revelation to me on the subject of cataracts and dislocated lenses.

Case 4.—The success attending these and other complicated cases gave me sufficient courage and confidence to attempt the removal on February 25, 1915, of a lens fully luxated into the vitreous, not a floater with a hinge, that would come into the

pupil at times, nor one purposely luxated, as in the Smith operation, but a fully detached one, the "impossible" one, that moved about and settled through very fluid vitreous into the lowest part of the eyeball in whatever position the eye happened to rest.

Mrs. C. H. T., sister of Miss L. (above), called on me April 28, 1897. She required and I gave her weak plus cylinder lenses for all distances. On July 11, 1907, ten years later, aged 46, both eyes seemed to feel a little firm to touch and uncomfortable. Prescribed eserine locally and iodides internally. Ever since 1907 the eyes, especially the left, have shown at times a trifle of tension and always been relieved by using eserine for a few days or weeks. There has never been sufficient tension to warrant iridectomy. April 27, 1910. While her visual fields were not diminished, the eyes had changed in thirteen years, requiring — 5.50 lenses with + 2.00 cyl. in the right, which gave — 20/30 each. The tension of the right was normal and that of the left was slightly plus. The lowering vision was due to an incipient cataract of the right and one more pronounced in the left. November 23, 1912. Tension normal in both eyes, vision unchanged. July 13, 1914. Found the right lens dislocated so far down and back that it was impossible to see it without looking from above downward, almost in line with the forehead. (See C in cut.) At this time the lens appeared to be hinged. Patient was advised to report when any unpleasant symptoms occurred. As the lens was far down and never approached the pupil, the patient wore a cataract lens over the right eye, which gave normal vision. For the last two months the right eye had "commenced to fail." This meant the beginning of the end. In the meantime I talked with some operators of large experience and wrote others, with little or no encouragement. Perhaps I allowed the gravity of this "impossible" case to weigh on my mind too heavily, since I had been successful already with a similar case. Anyway, I wrote Dr. Smith in India, who, busy man that he is, carefully and most kindly answered my letter:

"Dear Dr. Paine:

"It is very difficult to give an opinion, as you do not give enough details as to the present condition of the eye—a, the glaucoma, b, the vision, c, the condition of the fundus as seen past the lens. It is evidently a congenital case which has

grown worse. If the above conditions are favorable, I would advise extraction, the incision to be made full size and opposite the hinge which appears present—if possible then do an iridectomy. On completion of the incision the lens should float up behind the pupil—you may then have to slip a spatula behind it and press it to slide up the spatula from the outside of the cornea. To do this case you require a first-class assistant and to be a first-class operator by the intracapsular method (Smith's). The capsulotomy school of which Prof. Fuchs is an exponent are quite right to avoid such cases."

The doctor then gave me the names of two "good" American operators. I took the hint implied and read the letter to Mrs. T. She replied by saying that as I had saved one of her sister's eyes she preferred to have me try on one of her's rather than go to strangers. The glaucoma was quiet, the vision good and fundus also, or I should not have thought of either writing Dr. Smith or operating.

February 9, 1915. The lens of the second eye, the left, began to luxate, showing the characteristic lenticular crescent and opening at the top. This made four dislocated lenses in the eyes of two sisters. Certainly most remarkable. The dislocations occurred between the ages of fifty-one and fifty-seven.

Again something had to be done, so February 21, 1915, I successfully removed the lens, which was lying flat at the bottom of the vitreous chamber. The partially luxated left lens was still in situ.

I might state here that I usually instill atropin in the eye twenty-four hours prior to operating, as recommended by Dr. Smith, and give ten grains of veronal and a hypodermic of morphin half an hour prior to operation.

In operating on this eye, I first arranged a wire lead with the same twenty candle, ground glass, electric bulb in a handle convenient to hold when and where required. (The light should not be bright enough to make the patient wince and fight it.) Then, with a broad eye shade on, to protect my own eyes later, I made the preliminary puncture and counter-puncture. As this was the right eye, I sat at the patient's head throughout. (One must be where it is possible to look down to the very bottom of the eye, from above.) The assistant should never let his eyes move from the one vital spot.

and should be ready instantly to gently lift the speculum (and the lids with it) as soon as the counterpuncture is made, if there is oozing of liquid vitreous or tendency thereto. In this case there was an immediate showing in the wound. In cases of long standing the vitreous is likely to be quite fluid, and glaucomatous pressure will cause oozing with some force and perhaps hemorrhage into the eyeball if the incision is not made very slowly and gently. In this case it was made well back to relieve glaucomatous symptoms of long standing. When the knife has cut through the sclera, a long conjunctival flap or bridge should be left, and the knife withdrawn. This bridge keeps the wound from gaping, allows change of position, instruments, etc. Next pass a needle and thread through each end of the bridge, and with scissors or knife cut the bridge between the threads. Vitreous may press the iris down and make an iridectomy very difficult. It was so in this case. The iris turned down like a funnel, but I reached and grasped the iris by means of a very small, delicate, pair of curved forceps (Fuchs' pattern, I believe), getting one blade above and the other below its pupillary margin. A large iridectomy was made. When I wrote Dr. Smith, this lens appeared to be hinged, hence he wrote "on completion of the incision the lens should float up behind the pupil." In his book, page 22, is the following: "My experience in extracting such lenses" (he refers to lenses "couched" by the native doctors) "when they float up behind the pupil, is extensive, * * * once the incision is made, they float up tight against the pupil. * * * They are then quite readily extracted, their dislocation being almost complete." The Rawals are the immemorial specialists of India that "couch" lenses in eyes as a business. Thanks to these chaps, Dr. Smith has plenty of partially luxated lenses to remove. His remarks appear to refer entirely to "almost completely" dislocated lenses, those still attached or hinged. When lenses are hinged, and in a somewhat perpendicular position, the forward movement of the contents of the globe would naturally press them into the pupillary space. If, however, a lens is lying so that the top border points far backward and downward, the forward motion referred to above would push it still lower. If a draught of air hits a door one-third open, it will close it, if it is two-thirds open the same puff of wind will open it still wider. If a lens is entirely dislocated

and lying at the bottom of the globe, as in this case, I can think of no physical or mechanical reason to suppose it could or would present. Between writing Dr. Smith and receiving his answer, the lens had broken loose and was entirely free and floating about at will and rapidly producing clouded vision. (See D and E in cut.) The time to operate—if ever—had come.

To avoid disturbing the vitreous by reaching into it, I had my patient lie face down some time and tried gentle succussions of the head to cause the lens to drop through the dilated pupil into the anterior chamber, but it stubbornly refused. The lens was of normal size and in its capsule. While I can understand a small lens, as in case 3, passing into the anterior chamber, I should not expect a normal one, especially in its capsule, to pass through the pupil into the anterior chamber without help.

When the incision was completed the lens was nowhere in sight. I am still wondering what Dr. Smith does when lenses refuse to "float up behind the pupil." No mention is made in his book, nor suggestion in his letter. Now, incision made, iridectomy completed, no lens in sight, what next? Carefully close the patient's eye a moment, if you wish, while excluding all daylight, and light the one electric, ground glass bulb, which should be held about one and a half to two feet above and to the left of eye.

Carefully place under the upper lid a Smith elevator (or Fisher's modification of the same) and let the assistant hold the lids open, exposing the eye as recommended by Smith. By this method the tissues of the eyeball relax, settle back as it were, and the vitreous seems little inclined to prolapse. (I have never tried Angelucci's method, but in case 6 wish I had, as this case persistently rolled the eyes up and almost out of sight and reach.) With a magnifying glass (three-inch lens, three-inch focus) held in the left hand, or by an assistant, close to the face, throw a focal ray of light into the eye. Search the bottom of the eye until the luxated lens is located. It may take a little time to make it out distinctly. A head illuminator might answer, but I have not tried one. With the eye illuminated and lens plainly in view, take a minute, sharp hook or tenaculum—Tyrrell's might do, but I selected and used the traction hook that comes with the Stevens set (made by Meyrowitz

of New York) for operating on the external muscles of the eye. This hook has a slight prong at forty-five degrees from the shank or main handle, very convenient for catching the lens, and as a lens is so nearly the specific gravity of the vitreous, a very slight hold will lift it up. Pass the traction hook through the vitreous and hook into the lens. The lens can be and should be seen plainly by the operator using this method and its course and progress watched and directed as it is slowly and carefully raised up to the incision. Next, hand the condenser to an assistant, who should continue to keep the eye illuminated. Take a Smith spatula and carefully pass it behind the lens. (Don't use a spoon. It is concave.) The Smith spatula affords a smooth and flat support to the lens so it can be slid up and out by pressure applied to it from the outside of the cornea. The lens should be pushed, not lifted, out. If the hook holds sufficiently, the lens may be drawn—slid—up the spatula and out. My hook pulled out when the spatula passed behind the lens. Supported by the spatula, the lens was easily delivered by gentle pressure with a blunt hook on the lower part of the outside of the cornea. The lens was as clear as crystal glass. For a moment I could not see it as it lay on the spatula in the anterior chamber. The spatula was so bright and looked so distinct I thought the lens had dropped back again until a side ray of light revealed the characteristic red reflex and black segment of the lens' border.

Right here I want to emphasize the fact that without illumination, no mortal could have seen or dreamed where the lens was at any stage of the operation. In this case, the assistant and nurse, as well as myself, could see the lens at all times.

The conjunctival bridge was then drawn together and the thread tied. The edges of the iris were carefully tucked in and the eye closed. Aside from a trifling ooze of aqueous and fluid vitreous, at the time of the commencement of the incision, no vitreous was lost. A drop of adrenalin just before operating made all bloodless.

So far as I know, or can learn, this operation has never been done successfully before. Nor has the method or idea of illumination been mentioned by any one that I have ever heard or read of. Lenses have, doubtless, been fished for and sometimes scooped out at random, in the dark, bringing any-

thing that came with them, to the destruction of the eyes, so that the practice is condemned. To shade one's own eyes, remove pressure from the globe, illuminate the interior of the patient's eye, see the lens, catch it, and remove it, all the time seeing what one is about, without loss of vitreous, on a complicated "sick eye," is, so far as I know, unique.

Smith's operation for the extraction of cataractous lenses in their capsules is far more difficult than Daviel's—the usual method. But both of them are performed on comparatively normal structures. I operated on this case knowing that the authorities were against me and that the procedure was, certainly no less, perhaps a more severe test than Smith's, which is supposed to be the limit of operative technic.

It gives me great pleasure at the present time (June 30th) to state that the external appearance is clear and normal; the many floating objects that at first were present and annoyed the patient, have all disappeared; lacrimation, which at first was profuse at times, has ceased; no tenderness of the globe now exists; the illy defined sense of heaviness—discomfort—in the eyeball that was at first experienced has gone; and objects can be seen as well as with any eye from which a lens has been removed before being fitted with suitable glasses for distant and near vision.

She is using her old cataract lens and doing all her housework without any inconvenience with this eye. I expect to fit her eyes better soon.

Case 5.—This is the same person as case 4. On March 6th I removed the lens of the other eye (left), which began to luxate early in February. This lens was hinged at the bottom and when the incision was completed, floated well up into the pupillary space, being nearer normal than B (see cut), so that it could be plainly seen by daylight. A Smith (of India) spatula was passed behind it and it was delivered by external pressure as advised by Smith. The eye has recovered rapidly with no complications, and the patient returned home very happy.

There was a slight rush of aqueous and fluid vitreous at the end of the incision. While no harm was done, this could and should have been avoided.

Case 6.—Mr. G. C., aged sixty years. In March, 1914, the right eye was injured by being struck by a small piece of

candy, thrown in play by a child, and the lens dislocated. With an ophthalmoscope it could be seen hinged at its lower outer quadrant. It hung, floating backward, outward and downward toward the temporal side and bottom of the eye, in a position between B and C (see cut).

May 11th, 1915. Removed this dislocated lens. On opening the eye, the lens swung forward and upward enough to appear like a faint, indistinct, nebulous mass, without outline, in the lower outer portion of the pupil. External pressure failed to move it toward the opening, as it was too low down in the eye, being almost entirely below the lower margin of the pupil.

In this case I again used my method of illuminating the eye. When illuminated, the lens appeared clearly defined in the eye, and a Smith spatula was introduced deep down and behind the lens, which was then slid out on the spatula by means of external pressure. A hook was not used. The patient was very nervous and unruly.

The use or nonuse of illumination in this case would have been the difference between bungling guesswork and precision. To attempt to pass a spatula behind an illy defined, hazy mass, situated deep in the vitreous, seemed to me to invite certain failure, either by not getting behind it, thus pushing it still further down, or going too deep into the vitreous and needlessly stirring up the contents of the eye by excessive and injurious manipulation. In the opinion of my assistant and another physician who kindly assisted me, the lens could not have been extracted without illumination.

This patient recovered nicely without any complications.

My old Moorfield's eye speculum was used in both these cases. With case 5 it was used throughout, but with case 6, a very restless patient, it slipped out at a critical moment and the operation was finished with a Fisher's modification of Smith's lid elevator.

In this case, I found recently, on looking into the eye for the first time since the operation, that the fluids were clear, and vision good, but there was some detachment of the retina. The detachment is directly below where the lens was lying. Now, while the lens in this case was very plainly seen during the operation deep down in the vitreous, and a Smith spatula was passed behind it with precision, external pressure was

applied on the sclera because nearly the entire lens was below the lower pupillary border, about the position of C in cut. Did I produce the detachment by having some of the retina pressed or rubbed too hard by the lens which had a spatula behind it and another instrument outside on the sclera, or was the retina detached by the piece of candy that dislocated the lens, and the detachment hidden by the lens until it was removed? I cannot answer these questions, but I have decided to never again pass a spatula or a wire loop so deep into an eye, but gently lift the lens nearer to the opening by a Stevens traction hook, then place the Smith spatula behind it and use external pressure on the cornea, not again on the sclera.

SUMMARY.

Of the six dislocated lenses I have met in my practice, one was not operated on (case 1), and the eye lost all vision in six months. Case 5 was operated on without illuminating the eye, and case 3 could have been. Case 6 might possibly have been operated on at random, without illumination, but it could not have been clean work, and rough handling is not only objectionable but usually disastrous. Two cases (cases 2 and 4) absolutely required internal illumination. Without it the eyes were hopelessly lost.

Dislocated lenses are rare, otherwise, ere this, better methods than those employed and advocated would certainly have been devised for their removal. From my limited experience with them, contrary to the authorities, except Smith of India, I wish to advise and emphatically urge early operation in all cases of dislocated lenses. The sooner displaced lenses are removed the better the eye is likely to be and the operation attended with less complications. Every eye containing a luxated lens surely becomes pathologic, and the nearer normal at the time of operation the better.

These patients came to me for help. I thought and worked out a plan for each of them directly opposite previous instruction and reading. The results were due to illuminating the interior of the eyes during the removal of the lenses. The interior of an eye, with an aphakic pupil, can be easily and clearly illuminated and make a displaced—hinged—or lost lens appear very plain to the operator.

A suitable means of illumination should always be in readi-

ness, as a dislocated lens may be a complication at any time. Should a lens become dislocated while operating, and not plainly visible, illumination will permit one to locate it perfectly, when it can be successfully removed with gentleness and ease.

A recent textbook (Beard) says: "If the cataract must be fished for—the depths of the vitreous dragged, as it were—then a delicate wire loop would be the safer instrument to employ." It is no wonder that the after-results of eyes are bad when "the depths of the vitreous have been dragged, as it were."

Wood, in a "System of Ophthalmic Operations," states: "When they sink deep into the vitreous, the condition is a more serious one, and the wire loop should be used at once, in the hope of reaching them before it is too late." It is most unfortunate that the advice of textbooks to date leaves one groping in the dark concerning lenses that are rather deeply dislocated. I can only repeat: Illuminate these eyes, "get the hook," and remove the lens with the precision and ease associated with a plainly visible lens and it will never be "too late."

Next in importance to illumination, is to operate at the earliest possible moment.

It is advisable to be very careful not to finish the incision too quickly, as the vitreous may come with a rush. This explosive impulse, very likely to occur when the tension is plus and the vitreous rather fluid, as is frequently the case, can and should be avoided by having the lids gently raised by the speculum before the incision is completed so as to relieve the tension on the globe produced by the speculum; or a bridge of conjunctiva left, the knife removed and the bridge not cut until after the raising of the arms of the speculum show the globe relaxed, or the gentle oozing has relieved the tension or the tension has been relieved by Smith's method of holding the lids open.

Finally, if the lens does not "float up," use the hook rather than the large and crude spatula or wire loop to lift deep lying lenses into a more favorable position for using the spatula. With the interior of an eye illuminated, all sweeping or scooping motions, always dangerous or disastrous, are never necessary.

As a bridge of conjunctiva is often desirable to have, and

as the iris is likely to turn abruptly downward, in these cases an incision well into the cornea should be avoided, as it would make the grasping of the iris much more difficult.

I now know, and with deep regret, that I could have saved several eyes in my practice if my textbooks had only advised me to operate at once, make the incision so I could have a conjunctival bridge, if necessary, relieve tension from the eye by raising the speculum and lids, and if the dislocated lens was plainly visible pass a spatula behind it and while thus steadied slide it up and out by external pressure on the cornea; or, if not visible, to illuminate the eye, and if it was deep down in the vitreous, raise it with a hook into the pupil until a spatula could be passed behind it. I hope this one sentence will help some other gropers in the dark to save eyes.

ABSTRACTS FROM ENGLISH OPHTHALMIC
LITERATURE.

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The Effect on Accommodation of the Viscosity of the Lens.

LANCASTER, WALTER B., AND WILLIAMS, EDWARD R. (*Ophthalmoscope*, March, 1915). A series of ingenious experiments were carried out to show the viscosity of the lens.

In the first experiment the pp. was measured, using such a lens as would make the pp. fall at between thirty-three and twenty centimeters. The pr. was also measured, using a lens which brought pr. to between thirty-three and fifty centimeters. A test object was now placed one-third nearer the eye than its pp. measured in diopters. The patient was instructed to fix the object steadily and signal when it became clear. At first quite blurred, it almost invariably became clear and in focus in less than two minutes.

In the second experiment the subject was instructed to

move the test object along the scale to keep it clearly focused, but always as near as possible. A characteristic curve was obtained, at first rising rapidly, but gradually bending over and tending to become horizontal.

In the third experiment the test object is moved forward and back about ten or twelve times a minute from pp. to pr. along the scale. After ten or twenty minutes the pp. and pr. are quickly taken, and while the pp. is where it was at the start, the pr. is nearer.

The fourth experiment consisted of taking the pr. and pp. at regular and short intervals for ten to thirty minutes. The pp. remained stationary, but the pr. tended to come nearer.

The writer draws the following conclusions: "Our experiments show that when the zonule is relaxed there is an initial change which occurs quickly (less than a second), but that the change does not stop there; rather, the lens continues to become more convex, though at a slower and slower rate. The idea which we wish to convey is that the force which brings about the increased convexity of the lens is opposed by another force which it overcomes only gradually. There is a time element. We call the first force the elasticity of the lens, capsule, etc.; for the second, we suggest the name viscosity, for the time element is the essence of viscosity." W. R. P.

A Case of Destruction of Cortical Visual Centers by a Rifle Bullet.

WADDY, R. GRANVILLE (*Ophthalmoscope*, April, 1915), reports a case of a soldier, aged thirty-four years, who was shot through the back of the head with a rifle bullet. The bullet entered the left side of the head, five and one-half inches posterior to the outer boundary of the orbital margin, on a line one and one-fourth inches horizontally posterior to the tip of the mastoid process and three inches superior to that point, traversed through the back of the head, exiting slightly upwards and backwards. Upon regaining consciousness after nine days, he was unable to see anything beyond distinguishing light from dark, or coarse hand movements. The pupillary reactions to light, normal, but rather poor to convergence and accommodation. The fundus showed only slight hyperemia of the papillæ. The general condition of the patient was excellent. No change in the eye condition occurred during the subsequent four months.

The writer supposes that the angular gyri were injured either by the direct passage of the bullet, by hemorrhage, by compression of fractured bone, or callus formation. Doubtless, the cortex in the neighborhood of the calcarine fissure has also been traversed by the bullet. Although the injury to the parietal bones appears to be solely that associated with a clean-cut bullet wound, there may be more extensive fracturing, particularly of the inner table; therefore, too much reliance must not be placed upon this being a case of anopsia solely due to the passage of the bullet through the cerebral tissue.

W. R. P.

Glaucoma and Blood Pressure.

MACRAE, ALEX. (*Ophthalmoscope*, April, 1915), reports a series of experiments, the relation of intraocular pressure to blood pressure, and his conclusions therefrom.

The literature is fully reviewed. Twenty cases of primary glaucoma were examined as to their blood pressure as far as possible at the same time of day, and approximately the same interval after food, and under similar psychologic conditions. Seventy-one cases were examined as controls. Martin's modification of Riva Rocci blood pressure apparatus was used, three estimations taken and the lowest reading tabulated. The intraocular tension was estimated with the Schiötz tonometer.

Arranging the figures in decades, the following results were obtained:

Age Period.	Average blood pressure		Glaucoma pressure	
	Glaucoma cases	Controls	Higher by	Lower by
40-49.	140 (6)	134 (21)	6 mm. Hg.
50-59.	148 (4)	160 (29)	12 mm.
60-69.	154 (10)	159 (21)	5

(Number of cases examined in parenthesis.)

The author's figures, like those of Kramer and Kummell, are not uniformly either in favor of or against the theory that the average blood pressure in glaucoma is high. But while their figures tend on the whole to favor the theory, his, on the other hand, tend to oppose it; as at only one age period was the average blood pressure of the glaucomatous in his series higher than that of the controls.

In order to see whether it was possible to find clinically any confirmation, in the human subject, of the relation between

blood pressure and eye pressure which Henderson and Starling found in animals, the following experiments were performed:

The pressures of three young patients of an age at which the Riva Rocci may be presumed to give the genuine blood pressure were taken. They were then directed to take a short period of violent exercise—running up and down stairs—in order to cause a heightening of blood pressure. On their return the pressures were taken again.

In each case the blood pressure was considerably heightened by exercise, but in only one case was there any heightening of the eye tension; and in a second experiment in this same patient, the opposite effect was produced.

These experiments in no way indicate that the eye pressure in man alters with the blood pressure.

Considered along with the other points brought out in the paper, they suggest that an altogether exaggerated importance has been given to the blood pressure as a factor in maintaining or increasing eye tension. That it does help to maintain the eye tension no one will deny. But the eye tension may be affected in many ways which have no connection with, and no effect on, blood pressure; and conversely, the blood pressure may alter greatly without any corresponding effect on eye tension being observable. That blood pressure is of any importance at all in the causation of glaucoma is very doubtful. It is at least likely that the solution of the long standing problem of the etiology of that disease may prove to be a chemical one, with the well known phenomenon of osmosis as its base.

W. R. P.

A Pedigree of Hereditary Nystagmus.

Niccol, W. (*Ophthalmoscope*, May, 1915). A case of inherited nystagmus is reported, together with the data obtained of six generations of the family.

The patient was a laborer, aged fifty-four years, with continuous oscillation of the eyes. The nystagmoid movements were regular, rather slow, horizontal and concomitant, and slightly increased in rapidity in the extreme lateral positions of the eyes. On ophthalmoscopic examination, twitching of the lids was produced, which increased and finally became accompanied by "shaking" movements of the head. His vision was much below normal (6/36 partly) in each eye. This seemed to be due to myopic astigmatism which was present,

but correction with glasses gave improvement up to 6/18 only in each eye.

The hair was rather dark, but was said to have been decidedly fair in youth, and he still had rather fair eyebrows and mustache. The irides were light blue-gray.

Fundal lesions were present in this case, viz., one or two small patches of choroidal atrophy close to the macula in each eye. None of these were exactly central. In spite of the nystagmus, it was found possible to map out these areas by means of a Priestly Smith scotometer, although the blind areas thus charted were doubtless larger than they would have been had the eyes been steady.

This man was of rather poor physique, was said to suffer from chronic bronchitis and dyspepsia; but there was no evidence of any organic nervous disease. He had never worked as a miner. The movements, he said, caused him no inconvenience as a rule. He was perfectly unconscious of them, and objects appeared to him to be quite steady.

Fourteen individuals of this family were examined, of whom nine were affected and five unaffected; and information was collected regarding one hundred and thirty-eight individuals of the stock, six generations in all.

The nystagmus was found to be present in individuals of both sexes and transmitted by either parent, placing it in the second of Nettleship's groups. There was no instance of an unaffected male having transmitted the condition. It occurred in both sexes, yet bears strong resemblance in its mode of descent to the sex-limited diseases, in that it appears more readily in the male, but is transmitted most often by the female, who, moreover, is frequently unaffected herself.

Generation second contained no instance of nystagmus, the disease skipping a generation, as noted in some of Nettleship's cases.

Of the twenty-one nystagmists in this pedigree, twenty are living, of whom nine have been examined. The members of the family are all well aware of the existence of the peculiarity, and have noted that the nystagmus is present, in some cases at least, a day or two after birth.

In all the nine individuals examined the nystagmus was horizontal and concomitant. It varied in rapidity, but was in most cases a rather slow, irregular nystagmus. In two cases

the movements consisted of a rapid jerk to the left, followed by a slower return to the primary position. In both these cases the nystagmus was increased in the left lateral position of the eyes, and diminished in the right. In both cases, also, the patient had a tendency to hold the eyes slightly turned to the right, the head being turned slightly to the left; and the older patient stated that when she looked to the left, all objects appeared in motion.

In three of the nine examined, head movement was present on examination; and two of the others were said to show similar movements at times, when excited or looking intently at anything. In the remaining four it was said to be absent, and in three of these it is noteworthy that the nystagmus was very slight.

In all the affected individuals the vision is much reduced, and there is considerable ametropia. Also in no case was vision much improved by glasses. On the other hand, of four unaffected individuals examined, all had vision practically normal, and any refractive errors present were small.

All the cases were carefully examined with a view to finding evidence bearing on the question of albinism. It must be admitted that this yielded very meager results.

Visual fields were obtained in three cases.

The boundaries of the field were of normal extent, but there was interlacing of the fields for blue and red in all three cases. What the significance of this is it is difficult to say, but the color fields extend well out in all meridians; there is certainly no diminution in the sensitiveness of the peripheral parts of the retina.

The pedigree is carefully charted. In conclusion the author says: "This pedigree of hereditary nystagmus seems to be of value, not only in furnishing additional evidence of the soundness of Nettleship's conclusions, but in showing particularly that the cases of hereditary nystagmus with head movements are related to the male-limited class, and will probably be found eventually to conform in their mode of descent with the Mendelian laws.

The results of the clinical examination of the eyes in my case may be summed up by saying that there is defective central vision, associated with, but not entirely caused by, ametropia. In every other respect the eyes appear to be normal."

W. R. P.

Progressive Optic Atrophy After Fracture of the Base of the Skull.

DE KLEIJN, A. (*Ophthalmoscope*, May, 1915), reports a case of progressive optic atrophy occurring as a remote affection following fracture of the base of the skull.

A Belgian soldier, nineteen years old, was hit with the butt end of a rifle on the nape of his neck. Unconscious for four hours, with bleeding from the mouth, followed by persistent left frontal headache and pain in left cheek. The vision of the left eye gradually failed, until at the end of four months blindness ensued. Internal, neurologic, rhinologic and Roentgen examinations were negative, except pain on pressure over the trigeminus of the left side. The right eye then began to fail, until vision was reduced to 5/10, with progressive contraction of the visual fields to less than twenty degrees, colors all within ten degrees.

Epicrisis.—A patient sustains a severe blow on the back of the head, accompanied by unconsciousness and bleeding from the mouth. A slowly progressive optic atrophy on both sides follows, without any signs of inflammation. No neuralgia is complained of, nor are any nasal anomalies to be found. At the same time there is considerable painfulness of the trigeminus, first and second, on the left, and pain around the right eye later on.

Although the skiagram reveals no anomalies, the most probable cause is a formation of callus in the neighborhood of the optic foramina.

W. R. P.

On the Limitations of the Tonometer.

SMITH, PRIESTLY (*Ophthalmic Review*, March, 1915), discusses at some length the principle of the eye tonometer and its application. A number of experiments were made on human eyes in situ in the dead subject, and on the excised eyes of pigs obtained immediately after death. By means of a water manometer a known degree of pressure was established in the eye, the tonometer applied to the cornea, and thus the reading on the scale of the instrument corresponding with that degree of pressure (in that eye) ascertained. By applying the tonometer several times in succession in this way to a given eye, with the same internal pressure reestablished before each application, the degree of accuracy which the instrument does its work was determined. Variations of con-

siderable amount were found to be possible by faulty placing of the instrument upon the cornea, also when the readings on the scale of the tonometer were translated into mm. of Hg.

Smith concludes that when a tonometric observation is recorded, the reading, and not the supposed equivalent in mm. Hg., should be stated. 'The reading is a fact; the other is an inference which may be correct or incorrect. "We are told," he says, "that the pressure in healthy eyes varies from 13 to 27 mm. Hg. Whether this is true or not, only the manometer could say for certain, but it is extremely improbable. It implies that not only the pressure of the intraocular fluid, but also that of the blood in the large veins of the retina and uveal tract, is twice as great in some eyes as in others, and all within healthy limits. Knowing as we do that the pressure in different eyes may seem to differ 6 or 8, or even more, mm. Hg., while in reality it differs not at all, we may well doubt the inference.

Again, we are told that when the tonometer indicates an intraocular pressure of more than 27 mm. Hg., the presence of glaucoma should be suspected. Also, that glaucoma may coexist with a pressure of 21 or 22 mm. Hg. These are inferences. If we want the facts we must retranslate the figures. Then the statements are that a reading smaller than 2.5 should be regarded as a danger signal, and that glaucoma may be present even with a reading of 4.

Further inaccuracies, Smith contends, will be occasioned by such conditions as conical cornea, globular cornea or corneal ulcer.

He is far from considering the tonometer a useless instrument. Though it cannot measure absolute pressure, it can indicate change of pressure with great precision. Applied to the same eye at different times—e. g., before and after operation, before and after the use of a certain drug, at different hours of the day, etc.—it can give invaluable aid in determining the occurrence of pressure change when doubtful.

To further emphasize the importance of recording readings and not supposed equivalents, he points out that Prof. Schiötz himself has set the example of so doing.

This excellent paper is replete with findings of much interest, and should be read in its entirety to be fully appreciated.

N. M. B.

**Disease of the Small Blood Vessels as Studied With the
Ophthalmoscope.**

JACKSON, EDWARD (*The American Journal of Ophthalmology*, April, 1915), calls attention to the importance of a study of the small blood vessels, this being most easily done with the ophthalmoscope. The vessels of the fundus vary in diameter from 0.01 millimeter to 0.25 millimeter, and are distinctly visible. Eyes showing vascular diseases frequently come to enucleation, permitting a study of these changes in the laboratory. Much of what is known of vascular disease is of a fundamental character and should be at the command of every physician.

Vascular Spasm.—In some cases the sight is suddenly lost for a few minutes and the vision then gradually returns. This may occur to the same individual a number of times, the eye ground being perfectly normal between attacks. A few cases remain permanently blind, and the eye ground in these cases presents evidences of obstruction of the retinal vessels. Some ophthalmologists have been able to observe cases of vascular spasm during the attack.

Most of these cases recover the vision gradually without treatment. Jackson thinks that some cases of so-called retinal embolism, which recovered under nitrites and massage of the eyeball, were really cases of arterial spasm.

The wider interest of these facts lies in their application to small arteries throughout the body.

Permanent Obstruction of the Retinal Circulation.—A great many cases have been reported as embolism of the central retinal artery that were not of that nature, but were due to obstruction of the retinal circulation from other causes than embolism. The majority of these cases probably arise from thrombosis of the artery, starting in points of endarteritis, and some probably follow thrombosis of the central retinal vein.

Complete obstruction of the central artery is followed in a few seconds by blindness which is usually permanent. The immediate effect on the appearance of the arteries is little, but the veins are very much contracted. The opacity of the retina, which gives the fundus a pale appearance, is usually spoken of as edema, but there is little evidence of swelling of the retina. In a case reported by Shoemaker, which terminated in death eighteen days after obstruction, Hosmer found the degeneration amounted to ischemic necrosis.

Primary thrombosis of the retinal vein causes retinal edema, but does not cause the peculiar veiling of the eye ground as is seen in arterial obstruction.

Angiosclerosis.—In a great many cases obstruction of the retinal circulation is associated with changes in the vessel walls. With reference to the ophthalmoscopic evidences of angiosclerosis, the profession at large needs to ponder these remarks of Werner: "Every general practitioner admits the necessity of ophthalmoscopic examination in cases, say, of suspected intracranial tumor, whereas, I take it, comparatively few are aware of the importance of such an examination in the class of cases now under discussion. But yet, if we stop to consider for a moment, a cerebral tumor is, comparatively speaking, a rare affection and its treatment unsatisfactory, whereas angiosclerosis is a very widespread disease, and one in which medical advice and treatment, especially in the incipient stages, may frequently be the means of prolonging life for many years."

Aneurism.—Contrary to the general opinion, aneurism is rarely an evidence of retinal angiosclerosis. Aneurism is also associated with retinal changes resembling circinate retinitis.

Angiomatosis.—Known as von Hippel's disease. "The ophthalmoscopic appearances include a large, rounded, reddish body in the retina, entered by one or more dilated tortuous arteries and their accompanying veins. One part after another of the retina becomes affected. The retina becomes thickened, altered, and detached. All sight is lost and ultimately glaucoma intervenes, so that the eyeball has to be enucleated. Seven such eyes have now been studied microscopically." Recently Meller has put forth the view that this disease is primarily one of the glial tissue of the retina.

Tuberculosis of the Retinal Vessels.—"Both massive exudation and recurring retinal hemorrhage in young persons have been more and more traced to vascular disease, and particularly to tuberculosis."

Syphilis of Retinal Vessels.—Retinal vascular disease due to syphilis is usually recognized as retinitis or chorioretinitis.

Acute Infections.—Some acute infections cause metastatic ophthalmia and panophthalmitis, and in the rare cases in which the ocular lesions came under observation early, they indicate clearly their vascular origin.

Hemorrhage.—The ophthalmoscope has shown us many things of importance regarding hemorrhage from minute vessels. In the retina, hemorrhage is an indication of acute or subacute inflammation. Hemorrhage into the retina at birth is quite common. E. C. E.

Observations on the Topical Diagnostic and Psychiatric Value of the Wilbrand Test With a New Clinical Instrument.

WALKER, CLIFFORD B. (*Archives of Ophthalmology*, March, 1915). In order to examine hemianopic cases as accurately as possible for the presence of the Wilbrand prism phenomena, a rather elaborate instrument about five feet in diameter was built and electrically equipped to perform the test without the use of prisms. Small flash lights concealed in various parts of the inner surface of a large umbrella were controlled from a switchboard of about the size of an ordinary field chart so that a spot of light could be made to appear or disappear in practically any part of the field while the movements of the patient's eye were observed.

About twenty-six cases were observed, including both anterior and posterior lesions. In general, it was found that the results bore a relation to the position of the lesion only in so far as the lesion influenced the character of the field defect and the mentality or powers of observation of the patient. Thus, cases with homonymous hemianopsia of anterior or posterior origin were apt to refix the test object on the blind side more rapidly than cases of bitemporal hemianopsia, evidently because the former had learned by experience to deviate the eyes in one direction to find an object lost from view, whereas the latter had not acquired such experience, since the nasal field of one eye supplied the lost temporal field of the other eye. In practically all cases, of whatever origin, it was found that the patient would perform the act of refixation as the center light disappeared, even when there was no light in the blind field. This was called "pseudorefixation." Likewise, all cases had a decided tendency to perform "angular refixation"; that is, the eye would move out toward the blind field where the light last appeared, and then up or down until the light was refixed in its real position.

Thus it was concluded that while the test might be of some value in studying the mentality of the patient from a psychiat-

ric standpoint, it was of no value in determining the position of a lesion by virtue of the presence of a definite reflex arc. The conclusions were formulated in this manner:

1. The distribution of field defects in anterior and posterior lesions encourages psychologic factors, which greatly complicate the Wilbrand test.

2. The tendency to decrease the reaction time on repetition; the presence of seeking movements of the eye at all times during refixation; the presence of pseudorefixation, angular refixation, pseudoangular refixation; the tendency to central refixation, and pseudocentral refixation, all invalidate the Wilbrand test as a topical diagnostic reflex.

3. The results obtained by the Wilbrand test are surely a measure of certain processes of observation, memory, and thought, and are not an indication of the integrity of a definite reflex arc.

4. The possibility that this method of examination may be useful to the psychiatrist and thereby, perhaps, contribute to topical diagnosis, is suggested.

G. S. D.

Histologic Findings After Successful Sclerostomy.

VERHOEFF, F. H. (*Archives of Ophthalmology*, March, 1915). Up to the present only three eyes presenting a successful result after sclerostomy have come to microscopic examination. All three of these were removed after death. Verhoeff is now able to contribute the findings in a sclerostomized eye removed during life on account of a small sarcoma. Enucleation was performed seven and one-half weeks after the sclerostomy.

A typical bleb was present at the site of operation. The sclerostomy wound was partly filled with extremely delicate connective tissue, containing in its meshes a few tumor cells. This connective tissue evidently originated from the tissue of the bleb, and was not covered by endothelium on its free surface. The scleral edges showed proliferation, thus reducing the size of the opening. The bleb was composed of a highly edematous connective tissue network. Its epithelium was thinner than that of the normal conjunctiva. The edematous tissue of the bleb passed almost insensibly into the untraumatized conjunctival tissue.

Contrary to his previously expressed view, Verhoeff now

believes that the intraocular fluid escapes through the tissue spaces of the conjunctiva. In this case egress of fluid was apparently only prevented in proximity to the line of conjunctival incision, where there was formation of fibrous tissue.

G. S. D.

Traumatic Pulsating Exophthalmos, With Complete Bibliography.

BEDELL, ARTHUR J. (*Archives of Ophthalmology*, March, 1915). After falling on his head, patient showed diplopia, dilated pupil, beginning proptosis and pulsation of left eye. One year later there was thirty millimeters of proptosis. Veins of lid, conjunctiva and retina congested and tortuous. Both eyes affected. Pulsation present. Operation advised and refused.

A general consideration of the literature is given, and, based on this, Bedell advises that if ligation of the common carotid fails to cure, the superior ophthalmic vein should be tied.

G. S. D.

Concerning Removal of the Eyeball—(II) Fat Implantation.

GRADLE, HARRY S. (*Archives of Ophthalmology*, March, 1915), discusses the transplantation of fat into the scleral or orbital cavity. The first operator to use this method was Barraquer in 1901, and since then it has been used by a number of others.

If fat is to be implanted in the scleral capsule, Gradle advises the excision of a quadrangular section of the sclera and cornea and the preparation of four flaps. The interior of the sclera must be clean and dry. Fat may be obtained from the gluteal region under local anesthesia. The incision should be parallel to the fascia. A piece of fat two centimeters in diameter is dissected out and preserved in sterile gauze. The fat is then inserted in the sclera and held in place with a broad spatula. The first pair of scleral flaps is then sutured and afterwards the second sutured over these.

If fat be implanted in Tenon's capsule, it is best secured by a purse string suture.

In twenty-nine cases of enucleation the fat was extruded twice. In fifty-four cases of exenteration it was extruded six times. Out of five cases of beginning panophthalmitis in

which fat was implanted, extrusion occurred in three. Infection is thus a contraindication. In one-half the cases the fat had shrunk to one-half the amount implanted. Shrinkage may be counteracted by the injection of sterile white vasein.

(With the writer's dictum, that it seems advisable to implant fat in every case of enucleation or evisceration without infection, many will disagree, as the method has yet to prove its superiority.—Rev.)

G. S. D.

Discrete Lymphoid Infiltration of the Orbit.

COATS, GEORGE (*Archives of Ophthalmology*, May, 1915). Proptosis of the right eye forwards and slightly upwards and outwards, of ten months' duration, in a man aged thirty-seven years. Movements practically full. Firm resistance to backward pressure. Some enlargement of the retinal veins and blurring of the outline of the disc. Vision with correction, right eye, equaled 6/6 pt.; left eye, equaled 6/5. Exenteration of orbit. Seven years later commencing similar affection on the left side. Patient's health perfect throughout. Physical examination revealed no abnormality. Blood examination negative.

Pathologically.—Orbital tissues strewn throughout with numerous isolated nodules of lymphoid tissues, situated chiefly in the fibrous trabeculae and along the larger vessels. These nodules are composed not only of lymphocytes, but also of fully developed lymph follicles. No special concentration of the changes in the vicinity of the fornix or lacrimal gland. No microorganisms demonstrable.

The only cases presenting a real resemblance to this one are two reported by Birch-Hirschfeld. Coats believes that these three cases belong in a special classification.

Coats gives a very clear exposition of present views on the lymphomatoses, their classification and their relationship one to another. Most symmetrical tumors of the eyelids and orbits belong in this group. Tumors are commonly multiple, and usually appear in the lymph glands simultaneously. They rarely invade the orbit deeply.

The origin of lymphoid tumors in the orbit are discussed, the author inclining to the view that they arise from pre-existing cells in the tissues, the condition being a local expression of a general overactivity of the lymphopoietic appa-

ratus. The condition in his case probably was more closely related to the inflammation than to the tumor. It seems probable that the follicles may have been deposited in response to the inflammatory stimulus. Many features of the case are, however, obscure.

G. S. D.

Lymphoma and Lymphosarcoma of the Conjunctiva.

COATS, GEORGE (*Archives of Ophthalmology*, May, 1915).

1. Lymphoma.—A small tumor of the plica semilunaris is described, consisting of one gigantic lymph follicle. Somewhat similar observations on the part of Koerber, Morax, Teulières and Cosmettatos are quoted. These seem to show that simple lymphoma has been observed in young people, always from the inner portion of the conjunctiva. It apparently never attains any considerable size.

2. Lymphosarcoma.—Tumor of the left conjunctiva of two months' duration, in a woman aged twenty-nine years. A pedunculated pale red growth arises from the whole extent of the upper fornix, and in the lower tarsal conjunctiva there are several tuberculated masses. Repeated recurrences after removal. Finally extension back into the orbit, enlargement of a cervical gland, loss of health, and jaundice. Blood examination negative.

Microscopically the tuberculated masses from the lower conjunctiva show in general the structure of lymph follicles, but with certain minor differences. The main tumor consists of similar cells in larger masses, and with more tendency to a diffuse infiltration and invasion of the surrounding tissues. The recurrences show aggressive infiltration of a highly malignant type.

G. S. D.

Anomalous Nerve Heads With Good Vision.

GOLDENBURG, MICHAEL (*Archives of Ophthalmology*, May, 1915), reports a case of a negro in whom it seemed impossible to locate the optic nerve head. At the spot where it should have been was found a very small, intensely white spot about the width of an artery and about two or three times this length. The retina was normal except for a very marked pigmentation, which was very intense in the region of the nerve head and assumed a lighter shade toward the periphery. Con-

vergent squint was present, with slightly lowered vision in the left eye.

Goldenburg discusses other cases which have been reported in the literature, and regards his own case as simply a marked exaggeration of this anomaly.

G. S. D.

Plasmoma of the Lacrimal Sac.

VERHOEFF, F. H., AND DERBY, G. S. (*Archives of Ophthalmology*, May, 1915). Patient, Armenian, thirty-eight years old, showed a rounded, hard, elastic swelling in the region of the left tear sac, which did not disappear on pressure.

Along the tarsus of the left lower lid was a flat, yellowish growth six millimeters by three millimeters and a little less than one millimeter thick. The caruncle was enlarged and surmounted with a curious yellowish, waxy looking border. The semilunar fold was thickened and also the conjunctiva of the upper tarsus. The scars of an old trachoma were present. The tear sac was removed and also a piece of the conjunctival growth.

The pathologic examination showed a tear sac with an enormously thickened wall. The thickening was composed very largely of plasma cells. It also contained small and large irregular masses of hyalin material, which showed a definite relation to the blood vessels. The blood vessels showed a great increase in elastic tissue which later undergo hyalin degeneration.

This is the first case of plasmoma of the lacrimal sac. There are nine cases of plasmoma of various portions of the conjunctiva reported, but the condition is not as rare as this would show, for plasmoma forms merely an early stage of hyalin and amyloid degeneration of the conjunctiva, of which there are some one hundred cases in the literature.

Plasmoma, hyalin and amyloid degenerations of the conjunctiva present a varying picture, according to the stage the disease has attained. They usually affect the conjunctiva of the upper and lower lids, and extend in the form of a smooth red or yellow growth over the surface of the tarsus. The growth is nonmalignant but persistent.

Excision usually is of value if the thickening is so great as to cause deformity or difficulty in opening the eye.

G. S. D.

Acute (Bacillus Tularensis) Conjunctivitis.

SATTLER, ROBERT (*Archives of Ophthalmology*, May, 1915). Patient, woman of forty-three years, complained of a very irritable left eye. She was nervous, excitable, loquacious and mildly delirious. Marked swelling in front of the left ear. Edema of the upper lid. Conjunctiva of the bulb slightly chemotic, that of the lid and fornix swollen and dusky in appearance and traversed by thin, translucent, corrugated, sausage-like tubes or lines. Cornea clear. Irregularly scattered in the conjunctiva were small points of infiltration about the size of a split pea, resembling pustules which had ruptured and had been converted into shallow ulcers. The discharge was watery and straw colored. Temperature 104°. Constitutional symptoms very severe. Glandular enlargement. Excessive prostration, profuse chills and malaria. Excessive swelling in the neck.

Slow recovery with disappearance of the ocular symptoms. On the ocular conjunctiva was a distinct caseated node in the course of a dilated lymph channel. Following its removal an immediate reenactment of the same diseased process again took place within twelve hours. In two weeks it subsided.

This case is similar to that reported by Vail from which Wherry isolated the bacillus tularensis.

In the present case an animal inoculated with some of the material died in six days, and dissection showed lesions resembling those of the bacillus tularensis, and organisms resembling this bacillus were found.

G. S. D.

Concerning Removal of the Eyeball—(III) Ciliary Ganglion Anesthesia.

GRADLE, HARRY S. (*Archives of Ophthalmology*, May, 1915), traces the history of local anesthesia in the enucleation of the eyeball. He reports two hundred and thirty-six cases of removal or exenteration, one hundred and forty-six of which were done by ciliary ganglion anesthesia. Of these 85.6 per cent were successful in that there was the minimum of pain. Three contraindications: (1) extreme youth, (2) neurasthenia, and (3) ruptured panophthalmitis.

Technic.—After the conjunctiva is anesthetized the injection is made with a needle five centimeters long. The point of entrance is at the outer canthus, slightly above the median

line, along the upper border of the superior rectus. After the equator is passed the needle should be turned sharply inward, and it is inserted into the orbit forming an angle of forty degrees with the anteroposterior axis of the eye until the inner orbital wall is reached. One or two cubic centimeters of novocain one per cent, combined with a little adrenalin, is used. A second injection should be made into the conjunctiva at the lower portion of the bulb. G. S. D.

Changes in the Blood and Aqueous Humor in Methyl Alcohol Inhalation.

TYSON, H. H., AND SCHOENBERG, M. J. (*Archives of Ophthalmology*, May, 1915). The writers consider the general question of wood alcohol poisoning, and then go on to describe the experimental effects on animals after confining them in a box or belljar containing varying quantities of the vapor of methyl alcohol.

They found that if free ventilation were not maintained, one prolonged exposure always produced loss of consciousness, loss of pupillary reflex, slight contraction of the pupils, hypotension of the eyes, coma and death. If free ventilation were maintained, no such marked results took place. Repeated daily inhalations produced a loss of visual acuity and marked reduction in the general vitality. The higher the development of the animal species, the more severe were the results produced. G. S. D.

Coffee Amblyopia and Its Relations to General Intoxication From Roasted Coffee Products.

WOOD, CASEY A. (*Ophthalmic Record*, March, 1915). A case, the notes of which were given the writer by Dr. L. Harrison Mettler, is reported.

Woman, aged fifty-three years, noticed numbness in toes, ascending to the knees and then the hips. Then numbness and pain in the arms. Pains in arms and back, and weakness. Poor eyesight for four years. Hearing dull. Speech troubled. Diminished reflexes. Partial wrist drop. Sixteen to eighteen cups of coffee a day. Diagnosis, polyneuritis from excessive coffee. Complete recovery followed cessation of coffee drinking. Unfortunately, no exact measurement of vision and fields, and no fundus examination was made. G. S. D.

Congenital Cataract.

CLARK, C. F. (*Ophthalmic Record*, March, 1915), believes that the best method of operation is to make a free division of the capsule and stir up the lens substance freely at the first sitting, then follow this up by linear extraction at the most favorable moment, keeping the patient in the hospital meanwhile. He has never had serious results among his cases, and he takes issue with the writers of some textbooks who continue to advise repeated and small dissections.

G. S. D.

Report of an Unusually Large Mucocoele of the Frontal and Ethmoidal Cells—Operation and Cure.

POSEY, WILLIAM CAMPBELL (*Ophthalmic Record*, March, 1915). A marked prominence just below the brow increased in size and pushed the eye out and down. No pain or inflammatory symptoms. The eyeball was considerably displaced, but the vision was nearly normal. Rhinologic examination showed a mucocoele of the frontal sinus. An extensive operation was successfully performed and a mucocoele of great size was found. The result was excellent.

G. S. D.

The Technic of Iridectomy, and Its Performance as a Preliminary to Cataract Extraction—A Clinical Note.

SMITH, PRIESTLY (*Ophthalmic Record*, March, 1915), holds that if a preliminary iridectomy increases the number of successes by one per cent it should be done. He uses a Tyrrel hook, as it causes less pain. The scissors are best held transversely across the corneal wound. A lighted candle is held by the nurse as a fixation object for the patient.

G. S. D.

Tonguing the Eye for Foreign Bodies, the Cause—Pneumococcus Ulceration of the Cornea, the Effect.

WURDEMANN, H. V. (*Ophthalmic Record*, March, 1915), reports a case of a man who presented a superficial ulcerative keratitis. His wife had removed a foreign body from his eye with her tongue. The pneumococcus and the diplobacillus of Morax-Axenfeld were found in smears. Healing was slow. The wife came under treatment later, and it was possible to cultivate the pneumococcus from her tongue.

G. S. D.

Another Case of Mixed Irregular Astigmatism Following Injury.

LAMB, ROBERT SCOTT (*Ophthalmic Record*, March, 1915). The patient showed an incised wound of the cornea and sclera with incarceration of the iris. The other eye amblyopic. Under conservative treatment the wound healed and 6/4 vision was obtained, using crossed cylinders minus and plus, axes 85° and 35° respectively. G. S. D.

Hydrophthalmos Following Trauma—Report of Case.

MCGUIRE, HUNTER H. (*Ophthalmic Record*, March, 1915), describes a case of secondary glaucoma in childhood following an injury. Marked stretching of the eyeball took place and enucleation was finally performed. G. S. D.

Electrolysis in the Treatment of Trachoma and Its Sequelæ.

GEORGE, EDGAR J. (*Ophthalmic Record*, March, 1915), calls attention to the use of electrolysis in the treatment of trachoma, and reports gratifying results. One to two treatments a week are said to effect a cure. He advises it also in trachoma in the cicatricial stage. G. S. D.

Report of an Unusual Accident Which Caused the Loss of an Eye.

KOLLOCK, CHARLES W. (*Ophthalmic Record*, March, 1915). A man was shooting with a pistol at a bell hung in a tree about thirty paces from where he stood, and between twenty and thirty feet from the ground. The ball struck the bell and returned in the line it was fired, entering his right eye, which was destroyed. Kollock assumes that the ball struck the inner surface of the farther side of the bell, glanced around the inside and returned in the line in which it was fired. G. S. D.

Homonymous Crescentic Scotomas in Association With Ethmoiditis and Tooth-Root Abscess.

DE SCHWEINITZ, G. E. (*Ophthalmic Record*, April, 1915). A man, aged forty-five years, of good health and habits, suffered one month previously from pain over the left eye. Following this there was slight blurring of vision. Examination of the field of vision showed homonymous paracentral scotomata and there was some loss of vision in the left eye. The

X-ray showed several abscesses of the tooth roots and a posterior ethmoiditis. Appropriate treatment was followed by improvement. De Schweinitz is not prepared to locate with exactness the lesion responsible for these scotomata, but regards it as not impossible that they were situated in the left optic tract. They may possibly have represented incomplete ring scotomata. The fundus examination was negative.

G. S. D.

Intranasal Drainage of the Lacrimal Sac—A Simple Method.

PRATT, J. A. (*Ophthalmic Record*, April, 1915), believes that purulent dacryocystitis and closure of the nasolacrimal duct are best treated by making a direct opening from the internal wall of the sac into the nose. An incision is made into the sac, starting at the upper canaliculus. A dental bur is now introduced and a hole bored into the nasal cavity.

Another operation is described with the object of establishing drainage into the nose in cases where the sac has been removed. The opening is made with the bur, and a strip of mucous membrane from the lower conjunctival sac is pulled through and anchored to the outside of the nose. Seven cases are briefly reported.

G. S. D.

Aqueoplasty, or the Zorab Operation for Glaucoma.

WOOD, CASEY A. (*Ophthalmic Record*, April, 1915). Zorab's operation consists in inserting a loop of silk into the anterior chamber through a scleral or sclerocorneal opening and imbedding the threads beneath the conjunctiva. Several satisfactory results were exhibited at the Oxford Ophthalmological Congress of 1914. Wood has now performed the operation on two eyes blinded by glaucoma, and the results at the present writing are satisfactory.

G. S. D.

Retained Silk Thread or "Seton" Drainage From the Vitreous Chamber to Tenon's Lymph Channel for the Relief of Glaucoma.

VAIL, DERRICK T. (*Ophthalmic Record*, April, 1915), in a case of absolute glaucoma, passed a threaded needle through the coats of the eye in the region of the ora serrata and brought it out at a point about eight millimeters distant. The thread was buried under the conjunctiva. At the end of three

months the thread was removed. The tension was lowered to normal, and there was no return up to two years, when the patient died.

G. S. D.

Concerning Two Examples of "A Peculiar Form of Retinal Pigmentation" (Stephenson).

CHANCE, BURTON (*Ophthalmic Record*, April, 1915), publishes two cases of a peculiar form of retinal pigmentation first described by Stephenson. The first was a boy of ten years, who showed a number of groups of pigmented spots in the upper nasal section of the fundus extending forward beyond the equator. The second showed a normal vision and field, but extending from the macula outward beyond the equator were groups of brown and black spots, increasing in size toward the periphery. In each case only one eye was affected. Chance regards these spots as congenital. A colored plate is given.

G. S. D.

The Specific Treatment of Morax-Axenfeld Conjunctivitis.

GRADLE, HARRY S. (*Ophthalmic Record*, April, 1915). Wolff, of Amsterdam, in 1914 introduced a fluorescein zinc compound for the treatment of Morax-Axenfeld conjunctivitis. This is a reddish yellow powder containing 15.8 per cent of zinc and soluble only in one thousand parts of water. It is dusted lightly onto the lower tarsal conjunctiva, followed by a light massage. Wolff reported a cure of ten cases following a single application. In fifteen cases Gradle has used this substance, and, with few exceptions, has obtained a cure after a single application. He has also had striking results in low grade blepharoconjunctivitis of varying bacteriologic types. Slight burning occurs for one-half hour after use, and for twenty-four hours the tears are discolored a yellowish green.

G. S. D.

The Sclerocorneal Seton in the Treatment of Glaucoma—A Preliminary Report.

WOOD, CASEY A. (*Ophthalmic Record*, May, 1915). The pupil of the eye to be operated on is contracted by eserine. A narrow Graefe knife with a hole near its point is introduced as though an anterior sclerotomy was to be performed. The puncture and counterpuncture are made in the sclera near the cornea. A half curved needle and 00 braided white silk

suture is threaded through the hole in the knife, which is now withdrawn, carrying the loop of silk back through the puncture wound. The four suture ends are now buried beneath the conjunctiva.

In two cases, refractory to other procedures, a successful result has been obtained, although the period of observation is not yet long enough for final judgment. G. S. D.

False Heterophoria and Heterotropia.

MADDOX, ERNEST E. (*Ophthalmic Record*, May, 1915). This mathematical article, in the words of the writer, attempts to investigate the danger of diagnosing a vertical or horizontal deviation when none exists. It does not lend itself to an abstract and is well worth perusal in the original. G. S. D.

A Case of Traumatic Enophthalmos.

HANSELL, HOWARD F. (*Ophthalmic Record*, May, 1915). The patient was kicked by a horse, and received a fracture of the frontal bone on the left side. Examination three months later showed enophthalmos of the left eye, which was retracted at least ten millimeters, and rotation downward was limited.

Hansell discusses the causes of enophthalmos, and attributes the condition in this case to absorption of fat and cicatricial contraction secondary to fracture of the frontal and malar bones. He believes that the traumatism was sufficient to cripple the action of the obliques and induce a moderate cellulitis. The recti thereupon retracted the eyeball, fat was absorbed, and cicatricial bands formed. Cases of this nature have been analyzed by Birch-Hirschfeld. G. S. D.

Anterior Lens Ring Following Contusion—Report of a Case, With Theory Relative to Its Pathology.

CATES, THOMAS H. (*Ophthalmic Record*, May, 1915). A case is described, and the various theories which have been advanced to explain this condition are discussed. G. S. D.

A New Pair of Lid Retractors for the Cataract Operation.

VAIL, DERRICK T. (*Ophthalmic Record*, May, 1915). These retractors, pictured in the text, are designed to take all pressure off the eyeball. G. S. D.

Hole in the Disc Associated With Vibration of an Overlying Membrane.

HOLLOWAY, T. B. (*Ophthalmic Record*, May, 1915). A case is reported and a figure given. A thin gray veil covered the excavation, which showed a distinct pulsation. A number of cases of this anomaly have been reported. The hole is usually oval in shape and less than one-third of the disc in diameter. They are almost invariably unilateral. The lesion is usually in the temporal portion, frequently in the lower quadrant. The pulsation is probably transmitted from the central vessels. Various opinions have been advanced to account for the condition.

G. S. D.

Report of a Case of Reflex Ocular Disturbances Due to Impacted Third Molars.

DUTROW, HOWARD V. (*Ophthalmic Record*, May, 1915). The patient had headache, paralysis of the left external rectus, and a supposed spasm of the superior rectus and superior oblique. Impacted third molars were found and extracted. The muscular condition disappeared within a month.

G. S. D.

ABSTRACTS FROM GERMAN OPHTHALMIC LITERATURE.

BY

ALBERT C. SAUTTER, M. D.,

PHILADELPHIA.

MAX W. JACOBS, M. D.,

ST. LOUIS.

J. W. CHARLES, M. D.,

ST. LOUIS.

EUGENE J. BRIBACH, M. D.,

ATCHISON.

Cranial Deformity With Eye Symptoms.

LARSEN (*Klin. Monatsbl. f. Augenheilk.*, August, 1913) calls attention to the fact that Meltzer reported ten per cent of the blindness in the Saxon Blind Institute as due to tower skull. He himself found thirteen cases among ninety-three blind patients, and all were boys. In the later stages the picture is typical. The cranium is short and broad, so that the horizontal section appears almost circular; at the same time the cranium is pulled upward so that it appears tower-like or peaked. Protruding cristæ corresponding to the line of suture of the individual cranial bones, as well as the appearance of a boss at the site of the large fontanel, are common features. Roentgen photographs show irregular thickness of the cranial walls, and, amongst other things, early disappearance of sutures is observed and the eyes exhibit exophthalmos, divergent strabismus and nystagnus.

Failing vision first brings the patient to the physician. This is usually noticed between the first and third years. In nearly all late cases the ophthalmoscope shows a postneuritic atrophy; in the early ones, choked disc.

All are now agreed that the deformity is due to premature synostoses of the cranial wall, and that the final appearance is due to a retardation of growth in the united and continued growth in the ununited sutures. As the condition is found particularly frequent in boys, Larsen believes it due to an over-vigorous physiologic process, since normally there is a greater tendency toward ossification of the sutures in males than in females. Larsen had the opportunity to make examinations of the optic canal in one of these cases, and found that the optic foramen was of normal caliber. This adds evidence to the assertions of Bourneville and Varschütz, that the optic condition is not due to contraction of the optic foramen. Larsen believes that the boss seen at the large fontanel may be a precursor of tower skull, as is evidenced by the history of one of his cases. In nineteen cases the boss was found in thirteen, exophthalmos in fourteen, strabismus divergens in seventeen, strabismus convergens in two, and nystagmus in fifteen. In all of his cases vision was poor, the best being fingers at two to three meters. Other writers have reported as follows: Enslin at his clinic found seven of sixteen patients with good vision, although they had the typical deformity. Oberwarth reports eight cases, of which three showed no optic atrophy. Grieben reports eight cases without optic atrophy amongst sixteen patients. Larsen raises the question whether these patients really had premature synostoses. He believes that the optic atrophy is to be explained on the basis of intracranial pressure, and not because of changes in the optic foramen. C. Behr and others demonstrated high intracranial pressure by means of lumbar puncture. Prognosis for life and intellect are usually good. Trephining for the relief of visual impairment is justifiable; of course, only before great visual loss has occurred.

M. W. J.

Ocular Disturbances in a Case of Myxedema.

DUTOIT (*Zeitschr. f. Augenh.*, August, 1914). The twenty-five-year-old patient had not been able to attend school on account of poor vision, which became much worse at twelve years; and when he was old enough for military service he was almost blind. The lids were closed, tense, as if emphysematous, but quite hard under pressure, which left no pitting. The conjunctiva was thickened and edematous. The ocular

movements were slow and hesitating. The right eye converged. The pupils were dilated and reacted very slightly to light.

In both eyes there was posterior cortical cataract. In the periphery there were several foci of choroiditis, and in the retina everywhere large and small black pigment spots. The papillae were white, sharply outlined, and retinal vessels were much narrowed.

Thyroidin tablets given for five months seemed to improve the general condition, but naturally had no effect on the eyes.

J. W. C.

Regarding the Anaphylactic Origin of Sympathetic Inflammation.

CRAMER'S (*Klin. Monatsbl. f. Augenheilk.*, August, 1913) patient had a dislocated lens extracted, the wound healing slowly. A white mass followed by synechial formation was noted after the operation. Four months later sympathetic ophthalmia of the other eye with marked deafness, and after enucleation of sympathizing eye, baldness ensued and all of the patient's remaining hair, pubic as well as axillary, became snow white. The phenomenon is in accord with the deafness noted by Peters in sympathetic ophthalmia, and with the observation of others that the hair of rabbits falls out after the animals have been injected with the blood of an eye enucleated on account of sympathetic ophthalmia. Cramer believes with these symptoms we have good reason for thinking that we have to do with anaphylaxis. Histologic examination of the enucleated eye of Cramer's patient showed sympathetic ophthalmia.

M. W. J.

Mould Fungus Infection of the Eye.

DIMMER (*Klin. Monatsbl. f. Augenheilk.*, August, 1913). A man of sixty-seven years had had a severe inflammation of the left eye lasting five months. The sclera was protruding in places; there was iritis, and the vision gradually sank to light perception. No history of injury. At the protruding portions of the sclera pus exuded. For an endogenous origin speak the fact that foci were found at widely separated parts of the eye. Fungi were found in the choroid, which leaves Dimmer to believe that the infection may have ap-

peared by this route and thence reached the sclera, on the inner surface of which necrotic patches were found. There was no record of an injury, and histologic examination showed no evidence of an ectogenous origin of the infection.

M. W. J.

Keratitis Neuroparalytica Following Injection of Alcohol Into the Superior Maxillary Nerve for Facial Neuralgia.

DUTOIT (*Zeitschr. f. Augenh.*, July, 1914) reported the case of a forty-year-old patient who had suffered four months from severe neuralgia in the region of the superior maxillary, which had for a month involved the region of the ophthalmic nerve. With the exception of a dacryostenosis, the eye was normal. Under novocain, alcohol was injected into the superior maxillary nerve in the pterygomaxillary fossa from without. The pain disappeared completely in two hours.

Four days afterward, on the same side, there was a superficial loss of corneal substance, with hazy parenchyma in the lower outer quadrant. There was no facial paralysis. Cornea, conjunctiva and skin of lids were completely anesthetic. The Horner syndrome could not be elicited. There was no abducens paresis. Cultures from the conjunctiva were negative. Treatment consisted in three per cent, later five per cent, instillations of dionin three times daily, and one per cent subconjunctival injections every two days. The resulting marked hyperemia and watery secretion of the conjunctiva kept the cornea moist, and improvement was so rapid that in six weeks alcohol was injected into the ophthalmic nerve at the supraorbital fissure. Seven months later, the eye and skin of the lids were still somewhat anesthetic. The region of the ophthalmic nerve was markedly anesthetic.

Dutoit, emphasizing that this case was a simple disturbance of sensibility in the region of the trifacial, explains the mildness of the ocular lesion by the absence of the Horner syndrome, which always signifies a participation of the "trophic fibers of the sympathetic."

J. W. C.

Keratitis Parenchymatosa an Anaphylactic Phenomenon.

SCHIECK (*Zeitschr. f. Augenh.*, August, 1915). Keratitis parenchymatosa differs so from all other manifestations of

syphilis that it is difficult to concede that it is a direct result of the action of the *spirocheta pallida*:

1. It does not yield to salvarsan; only slightly to mercury.
2. A positive Wassermann is often combined with a positive tuberculin; and also, rarely, a negative Wassermann with a positive tuberculin.
3. The disease is usually bilateral.
4. The cornea is farther removed from the circulation than the iris or choroid; therefore, one would expect the latter to be the site of preference for luetic inflammation.
5. The disease belongs to the group of degenerative processes, rather than among the well-known syphilitic changes (Elschnig).

Granting the truth of the conception that anaphylaxis is a poisoning, and resulting necrosis of tissue caused by the by-products of the action of the antibody on antigen, and referring at length to the investigations of Wessely, Igersheimer and v. Szily, Schieck turns to hereditary lues. V. Clausen and others have shown that the cornea of individuals with congenital syphilis may contain spirochetes without effecting any alteration of tissue, whether these are degenerated or not—they furnish the possibility of the presence of an antigen molecule. The general organism acquires a specific immunity with the possibility that the cornea still hides unsplit antigen of the same sort. If, through any means, the antibodies of the serum reach the antigen in the cornea, the digestion of antigen takes place with release of anaphylactic poison. This occurs in trauma, scrofulous inflammations, etc., and often with a negative Wassermann and tuberculin tests.

Igersheimer has stated that since at puberty there is an impulse to increased secretion in the organism, there is a probable release into the circulation of specific products from foci which have contained spirochetes. These then gain access to the lymph spaces of the cornea and come into contact with the antigen. But this theory alone does not explain the often considerable interval between the onset of the inflammation in the two eyes.

If we conceive that as a result of the propinquity of antigen and antibody at any time the possibility of anaphylaxis is present, the difference in time may be explained: the irritated condition of the other eye becomes a factor because the photo-

phobia and dilatation of conjunctival vessels must have an influence on its metabolism and favor the contact of antigen in the cornea with the antibodies of the serum. J. W. C.

The Mechanism of the Disintegration and Resorption of the Lens and the Products of Disintegration.

GOLDSCHMIDT (*Muench. med. Wochenschr.*, March 24, 1914). Resorption of the lens is brought about by the absorption of the swollen lens of proteolytic ferment from the aqueous resulting from the action of autolytic ferments originating from the dying lenticular cells and the inconstant participation of the leucocytes whose proteolytic ferments may also help reduce the lens masses. M. W. J.

Investigations Concerning the Prevalence and Localization of Beginning Lens Opacities in Three Hundred and Two Persons Over Sixty Years Old.

BARTH (*Zeitschr. f. Augenh.*, July and August, 1914) found:

1. Lens changes in ninety-six per cent of all persons over sixty years old.
2. Cataract begins not directly under the capsule, but on the surface of the nucleus or deeper cortical layer. There is always a clear layer of cortex between the capsule and the opacities. Wherever subcapsular opacity was found, the deeper layers of the cortex were also involved.
3. A moderate grade of senile cataract must, therefore, be considered a physiologic senile change.
4. That the diagnosis and prognosis of "cataract" should not be inflicted upon elderly people with beginning lens changes, since we cannot judge whether they will remain stationary or progress to complete opacity. J. W. C.

Two Cases of Unilateral Melanosis of the Sclera, the Iris and of the Eye Grounds With Wart-like, Small Elevations on the Anterior Surface of the Iris.

FLEISCHER (*Klin. Monatsbl. f. Augenheilk.*, August, 1913) describes in his first patient, a female of consanguineous parentage, a one-sided melanosis, especially of the deep layers of the sclera, apparent only in the anterior portions, with an abnormal pigmentation of the iris. The iris was also thick-

ened and its surface wart-like in appearance. The other patient was also a female. In the first patient the choroid and retina were also abnormally pigmented. In both women the iris of the other eye was pale brown in color. Coats, some years ago, reported twenty-six cases, in seven of which melanotic sarcomata were found.

M. W. J.

Congenital Hypoplasia—or Rather Aplasia—of the Anterior Layer of the Iris.

RUEBEL (*Klin. Monatsbl. f. Augenheilk.*, August, 1913). A male of nineteen years showed the following: Anterior chambers very deep, and both irides of deep brown color. The anterior portion of the stroma on both sides, excepting in the extreme lower portion, is absent. No record of any inflammation of the iris. Rather marked degree of astigmatism in both eyes, amblyopia of one and inferior conus in both, lead Rübel to attribute the iris change to a failure of development, and he suggests the expression "marked hypoplasia of the iris stroma." He finds in this case further ground for the assertion made by himself in a former paper, that the structure of the stroma plays the chief rôle in the permeability of the iris to light. When these eyes were illuminated with a Sachs lamp, the pupil could scarcely be distinguished from the remainder of the anterior of the eyeball. The pigment layer of the iris was everywhere intact when viewed with the ophthalmoscope. Rübel noted that his case does not bear out the assertions of Much regarding the mechanism of the iris movements. Much asserted that particularly the pigmented stroma cells of the iris were instrumental in producing dilatation of the pupil. The pupils of Rübel's patient were exceptionally active, notwithstanding the fact that the stroma was largely absent.

M. W. J.

Five Cases of Hydrophthalmus Congenitus With Special Reference to Pathologic Anatomic Findings. (II Part.)

TAKASHIMA (*Klin. Monatsbl. f. Augenheilk.*, August, 1913) found an interstitial infiltration of the cornea causing in places a break in the continuity of Bowman's membrane. This resembled the so-called tearing of that structure, as described by Reis, Seefelder and others. Measurements of sclere showed, if anything, a thickening rather than thinning. He

gives no opinion whether this is compensatory or giant growth. A comparison of myopic and hydrophthalmic eyes reveals that whereas the former usually shows a posterior thinning, the latter shows an anterior thinning of the bulbus. No anomaly of the nervous or vascular system was observed by Takashima. He thinks the disturbance of filtration may be due to a variety of causes or factors. M. W. J.

Experimentally Produced Unilateral Nystagmus.

MANGOLD AND LOEWENSTEIN (*Klin. Monatsbl. f. Augenheilk.*, August, 1913) found that a unilateral section of the pes pedunculi cerebri of rabbits produces a nystagmus of the contralateral eye, and of varying frequency, lasting until death. The one sidedness has probably no connection with the section of the oculomotorius of the nonnystagmic eye. The nystagmus of the one eye is practically always accompanied by a marked deviation of that eye. This unilateral nystagmus is probably to be attributed to the injury of fibers which traverse the pedunculus cerebri and which are connected with the cerebellum. M. W. J.

Disturbances in the Synergism of Ocular Movements.

EPPENSTEIN (*Klin. Monatsbl. f. Augenheilk.*, August, 1913) believes that the abnormal movements frequently observed after disturbances, particularly of the third cranial nerve, are due to a regeneration of fibers in paths other than the normal. In this way fibers to the levator palpebræ may become abnormally numerous, which would lead to abnormal movement when impulses travel along the third nerve. M. W. J.

A Case of Retinal Hemorrhage Following Calomel-Salvarsan Treatment.

MORPURGO (*Muench. med. Wochenschr.*, March 24, 1914). Several weeks after the salvarsan injection the patient, a man of twenty-four years, who had but recently had an initial lesion, developed subcutaneous hemorrhages and epistaxis with hematuria. These symptoms cleared up after several days, when there was a recurrence with rise of temperature. Patient now complained of poor vision, and examination showed vision in right eye, fingers at two meters: in left eye,

fingers at three meters; with diffuse retinal hemorrhages in the macular region. Vision rose in sixteen days to 6/18 and 6/8, respectively. M. W. J.

A Case of Atypical Retinitis Circinata.

BACHISTEZ (*Klin. Monatsbl. f. Augenheilk.*, August, 1913). A woman of sixty-two years, with incipient cataract and vitreous opacities, showed in the macula, and to a much greater degree above the level of disc and macula, areas which strongly resembled retinitis circinata. Of interest is the atypical location of both lesions. W. M. J.

The Use of Mucous Membrane of the Lip in Keratoplastic Operations.

MENDE (*Klin. Monatsbl. f. Augenheilk.*, August, 1913) has used lip mucous membrane to cover corneal ulcers in trachoma when these refused to yield to ordinary therapeutic measures. The area is thoroughly cleansed and curetted, and the mucous membrane attached by means of sutures just beyond the limbus. M. W. J.

ABSTRACTS FROM FRENCH OPHTHALMIC LITERATURE.

BY

M. W. FREDERICK, M. D.,

SAN FRANCISCO.

JESSE S. WYLER, M. D.,

CINCINNATI.

Indications for the Use of Tuberculin and Antituberculous Sera in the Treatment of Ocular Tuberculosis.

DARIER (Indications respectives des tuberculines et des serums anti-tuberculeux dans le traitement des tuberculoses oculaires, *La Clinique Ophthal.*, October, 1914) published the experience of nine years' therapy in 1912, reporting forty-two cases in all, with twenty-five good results. Von Hippel and Bernheimer have added many more to the statistics. The experience of the past three years has added to the store of clinical knowledge of this specific treatment. According to Darier's opinion, von Pirquet's cutaneous reaction is as exact as any other, while the ophthalmic and subcutaneous tests are more dangerous. Usually, elimination of syphilis by negative Wassermann and therapeutic confirm the diagnosis.

Dosage.—After making the diagnosis in adults the B. E. tuberculin is used, as it is more active than the others. Infinitesimal quantities are used to avert reaction—one-tenth of a centimeter of the seventh dilution. Temperature is taken four times daily per mouth. In case of general reaction the dose is not increased; otherwise, every three days it is changed—one-tenth, one-fifth, one-third, one-half, three-fourths, one cubic centimeter of the seventh; then the same of the sixth dilution, etc. In certain individuals, in spite of all precautions, tuberculin B. E. is not tolerated, and it is necessary to use one of the less active preparations, as Beraueck, Mar-morek, or Vallei. To illustrate, he cites a case of recurring nodular episcleritis. B. E. was not tolerated. Cured after

two months' use of endotin. Recurrence in four months. Again B. E. not tolerated and a violent iridocyclitis present. Treated with Marmorek's serum and complete recovery after a series of complications. Treated further with the immune bodies of Spengler. Often these episcleritic nodules are diagnosed as rheumatic, since aspirin or the salicylates cause temporary amelioration.

The choice of a tuberculin in each special case.—The old Koch tuberculin T. A. has been abandoned by most of the clinicians as inferior to the others.

T. R. is much used in Germany, is well tolerated and gives good results, but has many recurrences following its use. To diminish these the emulsion was suggested by Koch B. E. as much more powerful.

A. F. (albumin free tuberculin) is less violent than B. E., but its clinical value as yet remains to be proven.

Endotin, prepared in St. Petersburg, contains only the endotoxins of the bodies of the bacilli without the waxy envelop. Darier has had good results and never noticed any marked reaction.

Very similar to this is the T. B. K. of Beraueck, which has also proven quite satisfactory to Sahli, Dor, and von Hippel.

The antituberculous sera are of great service in acute affections of the uveal tract, but for chronic conditions the effect is too temporary. Marmorek's is the only serum as yet employed in ophthalmology. Ten cubic centimeters are injected hypodermatically for four consecutive days. If a second series is judged necessary, care must be taken to avoid an anaphylactic reaction by increasing slowly from a minimum dose.

But despite specific medication, in a disease as insidious and treacherous as this, the other resources should not be neglected—good air, sun, kinetic and radiotherapy, etc., good food and digestion, cod liver oil, iodids, guaiacol, etc. J. S. W.

Tuberculous Keratitis and Its Treatment With Tuberculin.

LOTINE (Les keratitis tuberculeuses et leur traitement par la tuberculine, *La Clinique Ophtal.*, October, 1914) says that the importance of the etiologic factor has only been revealed within the past ten years, with the article of Stock as the prime

factor. The proportions of tuberculous infections vary from five to fifty per cent in parenchymatous keratitis. The author claims several distinct characteristics which distinguish the tuberculous from the syphilitic infection, namely, more or less diffuse opacities, limited to some distinct part of the cornea, surrounded by small yellowish white infiltrated spots lying in the middle or deeper parts of the tissue, and having the appearance of isolated tubercles. The entire cornea is never attacked at the same time, while often the process assumes the form of a marginal or sclerosing keratitis. The vascularization is never as intense as in the specific variety. At times one finds episcleritic nodules near the limbus, phlyctenular eruptions, or typical scleritis with iritis and possibly the formation of tubercles. The affection is usually monocular. Another form is the scrofulous keratitis with phlyctenae, now recognized as having a tuberculous basis of an attenuated form, and justly called keratitis paratuberculous.

The author reports twenty-five different cases treated by the von Hippel method in the past four years with T. R., starting with 1/50000 milligram injections once or twice a week, depending upon the reaction, until thirty to forty have been given. From his observations, he arrives at the following conclusions:

1. Tuberculous parenchymatous keratitis is more frequent than formerly suspected.
2. The majority of cases can be distinguished by careful clinical examinations.
3. Certain rare cases cannot be distinguished from those of syphilitic origin.
4. The von Pirquet and Wassermann reactions simplify the diagnosis.
5. Treatment with T. R. gives excellent and lasting results.
6. The mixed treatment of Bernheimer, consisting of injections of B. E., followed by the cutaneous method of Petruschky, appears to have practical value.

J. S. W.

Heterophoria—Present Status of the Subject.

REBER, WENDEL. (*L'Heteriophorie, etat actuel de la question, La Clinique Ophtal.*, October, 1914), gives a brief résumé of the subject, presenting the anatomy and physiology of the

muscles, connection between accommodation and convergence, connection between heterophoria and general health, methods of diagnosis, and nomenclature of the American school. He then takes up briefly esophoria, exophoria and hyperphoria, with few words concerning the treatment. As the entire article is merely an abstract of Reber's larger work upon the subject, it will not bear further synopsis and must be read in the original.

J. S. W.

The Use of Euphtalmin in Nuclear Cataracts.

DA ROCHA, Rio de Janeiro (L'Emploi de l'euphtalmine dans les cataractes nucléolaires, *La Clinique Ophtal.*, October, 1914). In certain nuclear cataracts in adults with clear corticalis, the patient is incapacitated, yet is unwilling to undergo an operation for iridectomy, or else is in such poor bodily health as to make this procedure unwise. Mydriasis would materially assist the patient to read and write, but the choice of the mydriatic is not easy, as nearly all the substances which dilate the pupil have secondary dangerous effects: namely: increase of intraocular tension and glaucoma (atropin and homatropin), paralysis of accommodation (atropin, homatropin and scopolamin, duboisin and cocain), general intoxication from absorption, irritation of the conjunctiva from prolonged use, etc.

Euphtalmin hydrochlorat, in three to five per cent solutions or ointment, will obviate all these inconveniences. Dilatation begins within twenty minutes and lasts four hours with the three per cent, and six hours with the five per cent. Dazzling is avoided by the use of colored glasses, and the solution is prescribed twice daily, morning and noon, and never after six o'clock in the evening. The author has never seen any untoward results from its use.

J. S. W.

Eye Injuries From Hand Grenades During the War.

COSMETTATOS, Athens (Blessures des yeux par des bombes a main pendant la guerre, *La Clinique Ophtal.*, October, 1914), forms his conclusions from the Balkan war. The long range of fighting has reduced the number of injuries from this source, but the trench fighting has again brought hand grenades into prominence. It is not the intention of the author

to detail a description of the various wounds, but simply to report three cases after a Greek-Bulgarian battle which were treated by him.

Case 1 showed in the right eye only superficial ulcerations of the cornea and tumefaction of lids and conjunctiva, the deep tissues not involved. The left eye revealed a complete rupture of the cornea horizontally with prolapse of the iris. Eye soft, vision nil. After abscising the prolapse, atropin first and iodoform later were used. The right eye cicatrized and 2/3 vision remained. The other eye developed an iridocyclitis with leucoma and anterior synechia. Vision was never recovered.

Case 2.—Lids of the right eye swollen, and conjunctiva ecchymotic. Inner limbus showed a wound of several millimeters, through which a fragment had entered the eye. No anterior chamber, irides and vision lost. Eye became infected and panophthalmitis developed. After the acute symptoms had subsided, enucleation was performed.

Case 3 was a complete destruction of one eye with only the membranes remaining.

From these cases it is possible to see that terrible results occur from the use of hand bombs.

J. S. W.

Eye Wounds in War.

DARIER (Blessures oculaires de guerre, *La Clinique Ophthal.*, October, 1914) mentions that after eight months of fighting, the importance of eye injuries can be realized. At first the lower limbs were most often struck, but in trench warfare the head is more exposed than the rest of the body, and so eye injuries have increased from five to thirteen per cent. Wounds from bullets, shells and shrapnel are much more numerous than from bayonets and sabers. The worst are the shell injuries, as high speed bullets sometimes penetrate without much damage. There is no field service in ophthalmic work. All cases are sent to Paris, but the writer hopes, when operations become more motile, to have a service of ophthalmic surgeons with the vanguard. He then enumerates the principal injuries thus far observed, amplifying several more interesting ones. In explosions of shells at close range the force of the wind alone can produce grave

lesions, as rupture of the tympanum. The men are thrown down, unconscious, with amblyopia or even amaurosis. Most often the reflexes produce hemorrhage of the retina or vitreous, and the prognosis is grave. Three cases of traumatic cataract were observed.

Extraction of intraocular foreign bodies is usually impossible, because the fragments are nonmagnetic. In the majority of cases enucleation is performed.

A case of nicotin amblyopia was observed in a captain who had not slept for three nights during the retreat of Charlevoi, and from fatigue and hunger had smoked incessantly.

A surgeon became infected with the pus of a gangrenous abscess while operating, and developed a severe iridocyclitis which, however, responded to energetic therapy.

They examined before and after trephining many skull fractures, with monolateral or bilateral choked discs. A case of aphasia and agraphia was cured by trephining on the side of the swollen disc. There was a case of cortical blindness of both eyes following the passage of a bullet through the calcarine fissure.

First aid by the general surgeon should consist of as good asepsis as possible, a soft but firm protective dressing, an injection of morphin and two or three antitetanic serum treatments. The sympathetic ophthalmias, so frequent in war, are not seen during the early days. Then the case can be referred to an oculist at the central service, and where the eye cannot be saved, enucleation is the best treatment, and artificial eyes given early. In eight months Darier has not observed a single case of sympathetic ophthalmia because the above régime was followed.

J. S. W.

ABSTRACTS FROM SPANISH OPHTHALMIC LITERATURE.

BY

WILLIAM H. CRISP, M. D., OPH. D. (COLO.),

DENVER.

A Case of Metastatic Cancer of the Choroid.

DEMARIA, E. B., AND ARGANARAZ, R., Buenos Ayres (*Archivos de Oftalmologia*, December, 1914). Only one case of metastatic cancer of the choroid has been seen in a clinical material of one hundred thousand eye cases in the Lagleyze clinic. The patient was a woman of twenty years. For three months there had been progressive loss of vision in the right eye, and later violent pains. Behind the clear lens the retina was seen completely detached. Under a diagnosis of choroidal tumor the eye was enucleated. Microscopic examination showing the growth to be a carcinoma, the patient was submitted to a careful general examination, with the result that a very small, previously unnoticed, nodular tumor was found in the mammary gland. Both growths were adenocarcinomata. The ocular tumor measured only three millimeters thick by fifteen millimeters across. The patient was subsequently lost sight of.

Nerve Grafts in the Optic Nerve.

LEOZ ORTIN (*Archivos de Oftalmologia*, December, 1914). The experiments were done on twenty rabbits, the nerve grafts being taken from the sciatic nerve of one rabbit and used to supply an artificial defect in the optic nerve of another rabbit. The steps of the ocular operation were: canthotomy at the outer angle, cutting of a rectangular flap at the region of insertion of the superior rectus, tenotomy of the superior rectus and superior oblique, separation of the bulbar conjunctiva from the underlying connective tissue, delivery of the eye as far as possible, isolation of ophthalmic artery and vein from the neurilemma, section of the optic nerve, and suturing in

place of the sciatic graft with very fine silk and in accurate approximation.

A lengthy insertion, by Leoz Ortin and L. R. Arcaute, extracted from the proceedings for 1914 of the Laboratory of Biological Investigation of the University of Madrid, analyzes histologically the regenerative processes of the optic nerve and retina associated with nerve grafts. (The work appears to have been done largely under the critical observation of Ramon y Cajal.) The following conclusions are reached:

In normal conditions the mere interruption of the optic nerve is never followed by repair of the cerebral segment. Intercalation of a nerve graft between the lips of the wounded optic nerve may, when conditions are exceptionally favorable, stimulate the nutrition and growth of nerve shoots ("retoños"), causing them to enter into the thickness of the transplanted nerve. During the passage of the nerve shoots through the retina, it is not necessary, in order that they should grow and orient themselves, for them to encounter preestablished conduits; but they make use of the narrow and irregular interstices existing between the dendritic expansions and the neuroglial appendages. At every point of detention appears in place of the cone of growth a thick terminal node. The irregenerability of the central nerve paths is not an essential property of the nerve protoplasm, but depends on absence from the normal medium of substances which stimulate the trophism of the neurofibrils. When the trophic materials are artificially present, the nerve shoots recover their embryonic capacity for rapid growth. The authors suggest that some day it may be possible to practice surgical grafting in the optic nerve, especially in intraorbital traumatisms.

Motais's Operation With Original Modifications.

MARQUEZ, M., Madrid (*Archivos de Oftalmologia*, January, 1915). This is a detailed description for Spanish readers of Motais's operation for ptosis of the upper lid, the writer's case being stated to be the first published in Spain in which the operation has been performed. The principal modification suggested is the passage of the sutures before instead of after detachment of the portion of the muscle which it is desired to transplant. The result was a brilliant success.

Operative Procedure in Ectropion of the Lower Lid.

DEL CASTILLO RUIZ, RODOLFO, Madrid (*Archivos de Oftalmologia*, January, 1915). A fold of the everted conjunctiva is seized with Graefe fixation forceps and excised with curved scissors, leaving an elliptical loss of substance, the borders of which are sutured with catgut. The method is used only in noncicatricial cases.

Paraspecific Serotherapy.

RIBAS VALERO, Seville (*Archivos de Oftalmologia*, January, 1915). In a case of corneal abscess just below the center of the cornea, steadily increasing in size, injection of twenty cubic centimeters of antidiphtheritic serum was followed within twenty hours by disappearance of the purulent infiltration, which was replaced by a superficial ulceration; the conjunctival secretion and injection being at the same time much lessened. Next day the ulceration was scarcely visible.

Cardinal Points of the Centrad Dioptric Systems Calculated According to Gullstrand's Method.

BIANCO, J. (*Archivos de Oftalmologia*, February, 1915). This article is mainly composed of mathematic calculations, as the result of which the author finds the values of the distances of the cardinal points to the vertex of the cornea measured in millimeters to be as follows: First principal point, 1.75211 millimeters; second principal point, 2.10825 millimeters; first focal distance, 13.75112 millimeters; second focal distance, 22.82832 millimeters; first nodal point, 6.9691 millimeters; second nodal point, 7.32524 millimeters; which coincide exactly with those determined by the classic procedures.

A New Operative Procedure for Cicatricial Ectropion.

MARQUEZ, M., Madrid (*Archivos de Oftalmologia*, March, 1915). The character of the operation is clearly shown by photographic and diagrammatic illustrations. It consists of the following steps: The V-shaped incisions of Wharton-Jones are first made (an erect V, obtuse-angled, its apex at some distance below the lid margin and its extremities near the lid margin at either end). If after dissection of the flap above, it appears that conversion of the V into a Y, in accord-

ance with the regular Wharton-Jones procedure, is sufficient, the operation is stopped at this point. If not, two rhomboidal flaps are made by carrying two incisions down from the apex of the V, each at a somewhat obtuse angle with the corresponding first incision; and then from the ends of these two new incisions making two further incisions parallel with or slightly divergent from the two incisions first made. If necessary to bring the border of the lid into its proper position, the scar tissue is extirpated. Tarsorrhaphy is done after freshening the edges of both lids. The rhomboidal flaps are loosened and slid upward so as to bring their opposing edges into contact, and are sutured in this position. The two triangular defects thus left below the sliding flaps may be either allowed to granulate or covered with skin grafts. The author has done the operation on five or six cases with very flattering results.

New Method of Autoplasty of the Lower Lid.

LEOZ, G., Madrid (*Archivos de Oftalmologia*, March, 1915). The author's technic is described only by illustrations. He prefers to take his reparative flap from healthy tissue outside the scarred area, using as little torsion as possible, and partly covering the raw area thus made with a flap containing the scar. He also resects the apex of the second flap, so as to improve its vitality.

La Grippe as Etiologic Agent of Glaucoma.

MENACHO, MANUEL, Barcelona (*Archivos de Oftalmologia*, March, 1915). In an epidemic of influenza the author saw three cases of acute glaucoma, of which at least two were, according to his understanding, indubitably connected with the gripe. He regards the eye condition as more commonly associated with the nervous variety of influenza, and suggests that it deserves the name "grippal glaucoma."

SOCIETY PROCEEDINGS.

BY

ARTHUR J. BEDELL, M. D.,

ALBANY.

CHICAGO OPHTHALMOLOGICAL SOCIETY.

Regular meeting, held March 15, 1915. Dr. William E. Gamble in the chair.

Congenital Anomalies of the Left Eye.

Dr. Herbert L. Walker reported a case of congenital anomaly of the left eye and exhibited the patient. The right eye was normal; distant vision 20/20 minus 1; left eye, 22/100; field contracted; absolute scotoma; nerve head colobomatous; arteries and veins anomalous; retina poorly supplied with vessels. Retina has misplaced pigment spots, but it is a question whether these are misplaced pigment spots or a diseased condition. The macula has a sac-like protuberance of about two or three times the size of the nerve head, and from the optic nerve fine fibers run over toward this sac-like protuberance. The sac is about four millimeters high at the lower portion, and at the upper it is about two diopters high. He believes there is fluid in the sac. The cyst is white. There are no vessels traversing it. It is almost transparent at the upper portion, with a greenish hue. The whole thing looks almost snow-flake like.

As to the literature, Fuchs speaks of a cyst-like protuberance at the macula and says it is congenital.

Discussion.—Dr. Harry S. Gradle said there was one or two things that would rule out the congenital phase of this case. There were inflammatory symptoms and signs in the

choroid and retina around the abnormality. At the lower edge of it the retina was fluffy. The retina was somewhat thickened, in which vessels appear, and there was a fluffy condition around the upper edge. There were several choroidal spots. At one point one of the vessels ran into it and disappeared. The whole thing ran on top of the nerve layer. If the condition were congenital, he did not think there would be these inflammatory signs, and there would be vessels showing on the surface of it. He thought it was some sort of inflammatory condition, and suggested puncturing the cyst with a fine needle.

Dr. Walker, in reply, said, first, there was coloboma of the nerve head. Second, there was an anomalous distribution of the retinal arteries, which was not due to an inflammatory condition. There were pigment spots, and the cyst-like condition at the macula was not due to an inflammatory condition. The cyst looked more like that of a cysticercus which was semitransparent. This, however, was not the cyst of a cysticercus. The retina was not normal. The pigment spots might be pathologic. To puncture the cyst would mean very heroic treatment, and he would not undertake to puncture a cyst so near the optic nerve. The patient consulted him on account of divergent strabismus which dated back to childhood. The man had forty-five degrees of divergent strabismus.

Lesion in Upper Portion of Cuneus.

Dr. George F. Suker exhibited a set of visual charts of a rather unique case. He also showed X-ray pictures of the case which were taken on the 18th of February. Patient was chief of police of one of the cities in the state who, while performing his duty, was held up and shot in the right occipital region, the bullet passing backward and upward and a little downward toward the right side. He was picked up unconscious, taken to the hospital, but nothing was done for him. He remained in a hebetic condition for several weeks until he recovered sufficiently to get about. Patient was sent to Dr. Suker for consultation. He showed three stereoscopic views of the field of vision. There was a distinct shadow round about the impact of the bullet, part of it pressing upon the inner table of the cranium and the other part outside of the skull. The fields disclosed homonymous symmetric

quadrangular hemianopsia to a degree. There was scotoma in the left eye, but not very definite. This placed the lesion, as far as he could determine, in the cuneus, and conformed to the exact lineation of the retinal fibers in their occipital endings, as outlined by Schaefer and Sanger Brown years ago. The lesion, he thought, must be in the upper portion of the cuneus, because the quadrangular fields were limited. The X-ray findings and shadows of the brain corresponded to about the location of the cuneus, and the man was recovering fairly well, although nothing had been done, because the bullet was not within the brain, and the edema present was most likely due to a hemorrhage by contrecoup. He thought it would be useless to do any trephining or decompression operation. This was the consensus of opinion of two other men who saw the case with him.

A very peculiar symptom was that when the patient looked down and turned his head toward the right and struck the blind field, he immediately had vertigo; he had the sensation of falling over a precipice, but as soon as he swung the eyes around this symptom disappeared. He had 20/20 vision, was presbyopic, with 4 or 5 D. There was no hyperemia of the disc or engorgement indicating the line of pressure along the optic nerve, either by choked disc or neuroretinitis.

According to the literature, there were only fifteen or twenty cases of such quadrangular fields on record.

Discussion.—Dr. Thomas Faith recalled two cases of homonymous quadrangular hemianopsia. One in a patient with pneumonia, who subsequently died. The other patient, a pneumonic case, lived for some time, was able to get about again, and was fairly comfortable. In her case the quadrangular hemianopsia persisted throughout life. She died suddenly without any explanation for her death. These cases were seen one winter, coming close together, within three or four weeks. He thought there might have been a local metastatic focus responsible for the trouble. Dizziness was very marked; so much so that the patient found it difficult to get around unless she had some particular guide and followed it in going from one room to another.

Dr. Suker said that this was the first instance where he could possibly trace the trauma to the cuneus lobe, or which conclusively proved to his mind the characteristic endings of

the retinal nerve fibers as far as the interpretation of objects was concerned. It was largely due to Sanger Brown that the checker board division of the retina had been accepted.

Injury of the Eyelid.

Dr. Oscar Dodd exhibited a man who on the 30th of January was hit at the inner corner of the eye with a cow's horn, tearing the nasal end of the upper lid off completely and also carrying the cartilage of the lid off from the levator. When he saw the man ten days later the upper lid was hanging down on the cheek, the nasal end completely severed. There was a large amount of granulation tissue, a great deal of ecchymosis, and considerable secretion from the conjunctival surface. Patient was sent to the hospital. Dr. Dodd was able to bring the lid up to place and coapt the torn surfaces very well; he managed to get the conjunctiva together and to coapt the skin perfectly. He then waited for the secretion to subside as well as the edema of the lid, so that he could operate upon the levator, for the lid hung perfectly motionless over the lower one. Two weeks ago he operated again, doing an operation exactly like the Bush operation for ptosis, with the exception that the levator of the lid, instead of being in place, was torn loose and separated three-quarters of an inch from the cartilage and retracted as far as possible. A large amount of new tissue had been thrown out, so that it was difficult to get at the muscle and free it and bring it forward. Finally he did so. He introduced three loop sutures to get the muscle, and sutured to the outer surface of the cartilage, suturing the skin separately.

There was one point in the operation which complicated it somewhat and had prevented an immediate cure. This was the fornix. He said he should have removed it when he brought the muscle forward, for it was impossible to free it entirely. The secretion was so great that he did not dare do it for fear of infecting the wound. So in bringing it down it formed an entropion of the superior fornix which extended down under the upper lid to the border of the lid. The edema was very great after operation, but this was subsiding. Later he expected simply to incise a large part of the prolapsing fold so that the lid will go back in place. Movement was very good, and he thought the patient would be able to use the eye without any trouble.

Injuries of the lid were quite rare, according to the literature. Injuries, however, of the eyeball from cow's horn were not unusual. Of twelve hundred and fifty severe injuries of the eyeball, where sight was lost, fifty-nine were due to injuries from cow's horn. He had seen a number of cases, but never one of the lid before—one where the levator was torn off so completely as in this case.

Dr. Michael Goldenburg related a similar case which came under his observation three years ago, but the injury was not the result of trauma from a cow's horn. A little boy, four or five years of age, came into the clinic with the upper lid hanging off to one side, held by a piece of skin four or five millimeters wide. He had been playing on top of a barn. In front of the barn there was a hook upon which harness was hung. Patient, who was on the roof of the barn, either fell or jumped off and caught the upper lid on this hook. He saw the patient two or three hours after the accident. He put sutures in the upper fornix, along the margin of the lid, the skin and outside. The boy made a perfect recovery, for one could hardly detect the scar after two weeks.

Dr. Lee Wallace Dean, Iowa City, Iowa, mentioned a family in which the history of any ocular or degenerative astigmatism was negative except for the appearance of a ptosis in the father. Every one of the children had ptosis. One child had a partial external ophthalmoplegia. The mother had no difficulty. It was a case of family degeneracy with hereditary ptosis and external ophthalmoplegia.

New Speculum.

Dr. Charles G. Darling exhibited a modified speculum designed by Crookman, which has separate blades above and below that fit into the main blade and will hold a piece of rubber tissue or oiled silk which will cover the margin of the lid, the lashes, and the skin of the lid, giving the operator a sterile field to work in.

Xeroderma Pigmentosum.

Dr. Lee Wallace Dean, Iowa City, Iowa, reported the ocular findings in two cases of this disease, and stated that it is a rare disease of the skin which makes its appearance frequently

in several children of a family, while the history of the parents shows no disease which can be associated in any way with the trouble in the children. The patients are born with normal skin, and develop in the first or, at the latest, during the second year, circumscribed red spots on the skin. These spots appear only on the parts of the body that are exposed to the sun. They disappear as a rule in a short time with scaling, but make their appearance again soon afterwards with the action of sunlight.

The eyes suffer in xeroderma from involvement of the lids and conjunctiva, and more rarely the cornea. The first signs of the disease usually make their appearance in the face and especially on the lids. With the scarring of the skin and atrophy, ectropion is produced. Usually very early in the course of the disease the eyelashes fall out. From the freckle-like spots warty elevations appear, which finally are converted into true carcinoma. These growths may affect all four of the lids. The conjunctiva is often affected by the xeroderma. In addition to the conjunctivitis, we find numerous red spots with pigment flakes and dilated blood vessels in the conjunctiva. In the beginning these changes are often very slight, but with careful investigation they are usually discovered. Marked shrinking of the conjunctiva is often noticed. Opacity of the cornea is frequently present. The tumors sometimes involve the conjunctiva. A true carcinoma of the corneoscleral boundary has been reported in xeroderma.

No definite therapy for the trouble is known. The carcinomatous nodules should be removed by surgical methods.

The first case was V. F., white, poorly nourished, female, eight years of age.

Examination of Eyes.—Right eye vision, fingers at fifteen feet. Left eye vision, fingers at six feet. There is an ectropion of the upper and lower lids of each eye, the ectropion being due in each case to the formation of a warty-like mass on the eyelid. These masses have the appearance of epithelioma of the lids. On the lower lid of the right eye the subcutaneous tissue as well as the skin is involved. On the other three lids only the skin seems to be involved in the pathologic process. Patient suffers somewhat from photophobia.

The tarsal conjunctiva of upper and lower lids of the right eye is very much thickened and reddened; numerous ectatic

vessels; bulbar conjunctiva markedly injected. Surface of the cornea smooth and glistening except near the nasal margin, where there are two whitish elevations of the cornea which look like piled-up epithelial cells. Each elevation is about half the size of a pin head. The whole of the cornea is diffusely opaque, the opacities being most marked in the upper two-thirds. Both conjunctival and ciliary vessels extend into the cornea, the vascularization being most marked above. The pupil dilates well with homatropin. Iris tissue apparently normal. The interior of the eye cannot be distinctly seen. The two little spots on the anterior surface of the cornea give the impression of being papillomatous.

The findings in the left eye are similar to those in the right, except in the outer margin of the cornea there is a pigmented spot extending from the root of the iris forward into the corneal tissue. This area is about five millimeters long in a horizontal direction, and three millimeters in a vertical direction. The spot looks just as if the deeper layers of the cornea had been tattooed with India ink.

Case 2.—Aged eight years. General condition and condition of skin similar to that of his sister, except he has no warty excrescences.

The general treatment of the patients is under the direction of Dr. Kessler, by whom these patients were referred to the author. The systemic treatment consists in the use of cocoa butter externally, and internally injection of autogenous serum. The latter procedure is carried out by drawing away from the patient blood, allowing it to clot, and then, by the use of the centrifuge, the serum is secured as clear as possible and reinjected. This treatment is improving the condition of the skin.

With the little girl, he has removed the warty-like tumors from each of the lower lids and from the right upper lid, and several of the growths from the face.

Discussion.—Dr. George F. Suker stated that two years ago he presented the cases of two children before the Chicago Medical Society. There were four children in the family. The oldest one was still living; three others had died since that time; one at the age of three, another at five, and the other at seven. He did not see the child that was three years of age, but the other two, aged five and seven years respect-

ively, came under his observation. The difference between Dr. Dean's cases and those he saw was that, instead of the lesions being carcinomatous, they were sarcocarcinomatous. The patient, who was five years of age, had a distinct nodular growth on the right cornea and a pustular nodule on the lower lid, causing a marked entropion, on which he performed a plastic. The eye subsequently had to be enucleated, and a short time thereafter the patient died. Both children were extremely emaciated. Serum injections and X-ray were tried, but failed. He lost track of the child of seven because the family had moved away.

Xeroderma pigmentosum is a rare skin lesion, and when it appears very little or nothing can be done for it. Usually the disease begins at two or more years of age, and seldom runs beyond the seventh or eighth year. He does not believe there are more than one hundred cases of the disease on record, covering a period of from eighty to ninety years.

A New and Safe Technic for the Cataract Operation.

Dr. William A. Fisher stated that if loss of vitreous and postoperative inflammation can be avoided in the extraction of a lens, it must be admitted that we are approaching an ideal cataract operation, inasmuch as normal vision is expected in every case where the cornea is clear and the fundus normal. The intracapsular operation more nearly approaches the ideal than any method he is familiar with, providing the operation is performed by operators skilled in the technic.

Dr. Fisher described the various steps of the operation by means of lantern slides, and mentioned two new details in the technic, one of which is the use of the lower lid hook, which is original with himself, and the other, the employment of the needle to assist in the delivery of the lens when there is threatening or actual loss of vitreous. The bandage is an important part of the technic, but the greatest care should be taken against any kind of pressure. He prefers four thicknesses of gauze long enough to cover both eyes, with a notch made for the nose to keep it from slipping away from the eye. The lashes are covered with carefully prepared yellow oxid of mercury ointment, grain one to a dram, and applied with a glass rod. The gauze is then laid upon the eyes and a starch bandage is applied.

Operators who have mastered the Smith technic will seldom use the needle or spoon.

After referring to accidents and complications that occur when performing the so-called classic cataract operation, Dr. Fisher drew the following conclusions: 1. Many lenses will be removed in capsule. 2. There is less postoperative inflammation. 3. Less infection. 4. Less secondary operations. 5. Less loss of vitreous. 6. Less time in hospital. 7. Better average vision. 8. Patients can be operated any time the opacity incapacitates them from their ordinary duties. 9. Safer technic than the old operation for beginners as well as experienced operators.

Discussion.—Dr. George F. Suker said a nice cataract operation is the quintessence of surgical skill, and since mastering the technic of intracapsular extraction, he feels safe in delivering the lens in its capsule. As regards the use of a fenestrated spoon for the delivery of a partially luxated lens, he does not think it is good surgery, and gave his reasons for it. Judging from his own experience, one ought not to have any great difficulty in doing intracapsular extraction, provided he has acquired the technic.

Dr. C. F. Burkhardt, Effingham, Illinois, asked whether there was greater danger of loss of vitreous from the intracapsular operation, as done by the average operator, who had not mastered the exact technic of Smith or Fisher, than from the old method of operating.

Dr. G. H. Mundt stated that until last October he held the same opinion as the majority of ophthalmologists in regard to the Smith intracapsular operation, but since seeing Dr. Fisher perform twelve or fifteen of these operations, and having operated in this manner himself, the operation appealed to him very strongly. The vitreous did not present more than once in the twelve or fifteen operations he saw. The lid hook simplifies the operation very much.

Dr. Thomas Faith emphasized the importance of mastering the technic of the Smith-Fisher operation, and since doing it he had performed the intracapsular operation in four cases, and although he was a doubting Thomas at first, the operation now appealed to him.

Dr. Oliver Tydings stated that so much had been said about loss of vitreous in the Smith operation, that many members

of the profession had learned to regard this as a part of the operation, but if one would study the statistics, he would find they did not show a more frequent loss by this than by any other method; nor was this all, for if one would carefully analyze these losses, he would find by the Smith method the loss was as a rule slight, while by the classic method, when the vitreous came ahead of the lens one felt very happy if he could extract the lens and get through with the toilet without losing more than one-third of the vitreous. By the safe method described it was almost a physical impossibility for a careful operator to lose vitreous. This safe operation had been made possible by the use of lid retractors to relieve all pressure, the double hook being one, and the needle to be used in case of necessity when trouble arose, due either to too small an incision or too large a lens. By this method one would leave some capsules, but would save all vitreous.

The objection to leaving a bandage on for nine days was only the protest of the untried. The members of the society had every reason to be proud of the technic so materially aided in its development by one of the members. The Smith-Fisher technic was the best thing in cataract extraction. Dr. Fisher took the safest and best operation yet devised and had robbed it of every possible danger.

Dr. John R. Hoffman stated that since Dr. D. W. Green demonstrated the intracapsular extraction in 1912 in Chicago, he had been an advocate of the operation and had practiced it with good results. In many operations where he could have done an intracapsular extraction, he had to do the old operation because of unfavorable conditions present after the incision was made, and the lack of knowledge of the technic for surmounting them. In his earlier operations he followed the technic, as near as possible, described by Dr. Vail in his clinical description of the operation, but he failed to get the idea of the use of the spoon in delivering the lens in impending loss of vitreous. Had he gotten the idea of the physics of the spoon delivery in mind, he thought he could have done more intracapsular extractions. He did not get the technic of the spoon until after the return of Dr. Fisher from India. Since then he had had some experience in its use, and agreed with Dr. Fisher that it was liable to produce a decided disturbance of the vitreous. Since Dr. Fisher had given the technic of

the use of the needle, he was reluctant to use the spoon except as a last resort, as with the needle, even though the capsule was ruptured, it was left in such position that very little irritation was caused by its presence, and it was out of the line of vision, or if it was not, it could be needled as after the old operation.

The lid retractors and hooks were a good substitute for the speculum.

Dr. Fisher had worked out a technic which would prove as near a safe one in cataract extraction as possible, especially in immature cases where the patient would suffer great economic disadvantage in waiting for maturity; would do away with the dangers of the old operation where capsule remained, and would also help the practitioner in doing many intra-capsular extractions.

Dr. Fisher, in closing, answered the question of Dr. Burkhardt by quoting his last conclusion, which reads: "Safer technic than the old operation for beginners as well as experienced operators."

When he was working with Dr. Smith in India he thought the Smith technic was so good that it could not be improved upon, but as soon as he returned to Chicago and began operating, he felt the necessity of modifying the operation, and these modifications had been suggested to him in doing fifty intracapsular operations without Dr. Smith and his assistant. He believed, therefore, the technic he had described was the safest yet devised, both for good operators as well as for beginners.

Gram Negative Diplococci in the Conjunctiva.

Dr. Robert Blue selected this subject as an entrance thesis, it having been suggested to him by the finding of Gram negative diplococci in smears from a case of conjunctivitis which proved to be *micrococcus catarrhalis* on staining and cultural growths. After briefly outlining the laboratory technic, the limits of variability of this organism were discussed. Emphasis was laid upon the necessity and advantage of classifying bacteria according to groups or families, rather than as individuals. The basis of this grouping is found in the usual habitat, morphology, staining reaction, cultural characteristics and agglutination phenomena of the bacteria.

The members of the group denominated Gram negative diplococci, that is, the micrococcus catarrhalis, meningococcus intracellularis and the gonococcus, were then individually discussed, from both the clinical and laboratory standpoints, the literature on these points being freely quoted.

The paper closed with certain clinical deductions, among which were the necessity of treating any purulent conjunctivitis containing Gram negative diplococci, resembling the gonococcus, as a gonorrheal conjunctivitis, pending a definite diagnosis, and the necessity of guarding against a diagnosis of mild gonorrheal conjunctivitis without using exhaustive cultural and laboratory tests.

Discussion.—Dr. George F. Suker said that many cases diagnosed as gonorrheal ophthalmia, and said to have gotten well in four or five days, were not true cases of this disease. Gonorrhea, whether it involves the conjunctiva or urethral mucous membrane, would not get well in two or three days, so that the time limit for the cure of the disease would eliminate gonococcus infection.

Dr. Thomas Faith stated that, after hearing the paper, he was more and more impressed with the little value that one could attach to the ordinary slip-shod bacteriologic work done in the office, and that if any of this work was to be done at all, it should be done by a thoroughly trained expert.

Dr. Wesley Hamilton Peck called attention to a paper presented by Professor Nogouchi, in which he brought out the same line of thought in regard to the differentiation of the spirocheta pallida from other organisms that might be confused with it. Later, about two years ago, Rosenow presented a paper before the Chicago Medical Society, in which he demonstrated conclusively the possibility of the pneumococcus being transformed into a streptococcus under certain changing environment.

He thought the society should thoroughly appreciate Dr. Blue's continuation of this subject in reference to ophthalmology.

Regular meeting, held April 19, 1915. Dr. Richard J. Tivnen, president, in the chair.

Paralysis of Both External Recti.

Dr. William H. Wilder exhibited a little girl, seven years of age, previously perfectly healthy, who, while riding a bicycle, was thrown over the handle bars and struck against a wagon, injuring the right malar bone. She was not rendered unconscious, but somewhat stunned. The left ear drum was ruptured, and there was considerable bleeding from the ear. She was nauseated soon after the injury. About four or five hours later, it was noticed by her mother that her eyes were crossed. There was distinct and complete paralysis of the right external rectus, and almost complete paralysis of the left external rectus; otherwise the eyes were in every way normal. The media were clear. The eye grounds were normal, and she had vision of 20/20 or better in each eye without correcting glasses.

The fact that the paralysis did not occur immediately, but some four or five or six hours after the receipt of the injury, would seem to suggest that it was not a fracture of the bone that caused injury of the nerve, but that it was more than likely due to the hemorrhage that resulted from a rupture of some of the small vessels in the meninges. Possibly this explained the paralysis of the left external rectus as well as that of the right. He brought this forward as a suggestion and as the more probable explanation of the condition, and if so, it might hold out a more favorable prognosis than if the nerve itself had been cut, because then there would not be so much hope of regeneration, and recovery would be longer delayed.

His experience with these cases was that he had seen only a few of them, but never a double one before. He had seen cases of injury of the sixth nerve from blows, both from fracture at the base of the skull and from a blow on the side of the head. The prognosis in those was fairly good. Recovery ensued anywhere from three to seven or eight months.

Discussion.—Dr. Wesley Hamilton Peck said the drum membrane might have been ruptured and hemorrhage come from the ear on account of a fracture of the petrous portion of the temporal bone.

As to the sixth nerve being involved, he thought some light might be thrown on this by taking X-ray pictures in the same

position they were taken over the mastoid, the top of the head, so that one could only get one temporal bone in the picture. If stereoscopic X-ray pictures were taken, they would no doubt assist materially in showing if there was fracture of the temporal bone.

Dr. Brown Pusey stated that some three or four years ago a similar case came under his observation, the patient being a boy, fourteen years of age, who was thrown off a horse. He made a recovery at the end of three months. In this case he attributed the paralysis to a hemorrhage at the base, catching both nerves along the course up under the pons.

Dr. Wilder, in closing, said that X-ray pictures had been taken by Dr. Potter, but he had not had an opportunity to study them as yet, but would soon do so. With stereoscopic X-ray pictures one might be able to see a fracture if there was one present.

Ulcer of the Cornea Complicating Cowpox Infection.

Dr. J. Sheldon Clark stated that he did a good deal of his work in a dairy district, and it was his fortune to see two cases of ulcer of the cornea complicating cowpox. In the first case the eye was lost.

The case he reported was that of Mr. A. L., thirty-two years of age, who came to him last spring for an ulcer of the cornea. He had a cowpox infection at the time he came, and had a number of vesicles on different parts of the body, particularly on the hands and face. He had a large corneal ulcer which covered about one-half of the cornea. This healed under treatment which lasted for a few months. In a dairy district one occasionally saw such infections on the hand, but he had seen only two of them infecting the eye. In this case the systemic symptoms were marked and were similar to those of smallpox. Patient also had pigmentary nevus in one eye.

Keratitis Petrificans.

Dr. Harry S. Gradle presented a case for Dr. Young, of Burlington, Iowa, who unfortunately was unable to be present. The patient suffered from a foreign body in the left eye for about twenty months. Two days after the foreign body entered the eye an ulcer appeared which lasted for two months. Following the ulcer there remained a scar on the left cornea.

This had not changed markedly in size in the past fifteen months, although yellow oxid of mercury, massage, and iodids internally, and practically everything else had been resorted to except surgical interference. This scar was rather dense, involving the superficial areas of the cornea. The eye was painful, and the man could not get very much better vision. The patient wanted to get relief, and the speaker expressed a desire to have the case discussed and, if possible, some suggestions offered with reference to treatment.

Discussion.—Dr. George F. Suker said that calcareous degeneration of the cornea, or lime deposits, did not occur in an eye that was chronically inflamed, or had chronic inflammation of some kind or another. If the eye was let alone, he was under the impression that the patient would lose it entirely, and it would have to be enucleated on account of pain. He had had just such an experience in two cases, and had he known then what he knew now, he might have saved the sightless eye—which was better than a glass eye—by having this portion of the cornea excised and a corneal graft transplanted, or the whole thing might be excised with a cataract knife, and in addition a flap turned over with the conjunctival flap. In this way the eye could be saved and the pain stopped.

Dr. Wilder said it seemed to him that the pupil was not more than half covered, and before attempting anything so radical as a grafting operation, which is difficult and uncertain, he thought it would be proper to excise this portion of the cornea by curettement, and then possibly add to that the cautery. Both methods combined, curettement and then cauterizing this area, might destroy the nerve endings and relieve the man entirely of the pain, and make a good white scar. It did not make any difference, so far as the sight was concerned, if it did not encroach any more upon the pupillary area of the cornea. He thought this was the measure to try before attempting a more difficult keratoplasty.

Dr. Harry S. Gradle mentioned a method which was advocated years ago, namely, to trephine an area about the size of the scar, taking in clear corneal tissue about half the depth of the cornea, turning the trephine button on itself, and clearing away some of the scar from the pupillary area. The man who had suggested this method had met with success in several cases; the turned button had remained. If there was a possibility of doing this, the pain would be less.

Optic Neuritis.

Dr. Emory Hill presented and reported a case of optic neuritis. The patient, a man, twenty-nine years of age, consulted him last October with headaches which were relieved by refraction. Patient had approximately one and a half diopters of hyperopic astigmatism in the eye. The unpleasant thing was the appearance of the eye grounds. The left eye had a swelling of the disc with two and a half diopters. The right eye had no swelling of the disc, but a distinct arteriosclerosis of the retinal vessels. The patient stated that at intervals for five years he had been told that he had something interesting about his left eye. He had had examinations made, but nobody had discovered anything wrong except he had a peculiar nerve. His vision with correction was $6/4$ in each eye. In October there was no enlargement of the blind spot. When he presented the patient last month before the society, he thought the swelling of the left nerve head might be congenital, a so-called pseudooptic neuritis. Since last month the right disc, which was not swollen in October, had become blurred and swelling had come on which was at least two diopters in height. The swelling in the right eye was more typical of optic neuritis than in the left. The vessels dipped in and out of the edematous area. Vision was still $6/4$ with correction, but there was a distinct enlargement of the blind spot for red, and a trifling enlargement for blue and white in each eye. A Wassermann was negative. Careful physical examination showed the urine negative, and blood pressure normal for his age. Patient had a rather full and firm radial artery. He had a sclerotic condition of the vessels in the right eye. His sinuses, nose, tonsils and teeth were normal.

The diagnosis was interesting. Unquestionably the condition in the right eye was a true neuroretinitis, while the condition in the left eye, he was inclined to think, was the same, and not a pseudoneuroretinitis, as he supposed at first.

Dr. George F. Suker stated that Dr. Hill's case resembled the case of a woman whom he presented to the society two months ago, where the condition began in one eye and then traveled to the other. It extended over a period of a number of years. Whether the two cases were alike he could not say; nevertheless one should make a skiagram.

Dr. Brown Pusey recalled one case in which there was a pseudooptic papillitis in one eye but not in the other.

Dr. Casey A. Wood said that when Dr. Hill described his case he thought it might be one of pseudooptic neuritis, as such cases had been described in the literature; but with enlargement of the blind spot he thought one was justified in believing it was a case of optic neuritis with well preserved central vision, and without any limitation of the peripheral fields.

Dr. William H. Wilder did not think that all cases of optic neuritis were symmetric. There was apt to be asymmetry in these cases, as in other anomalies, but in this particular case he thought it could be excluded from Dr. Hill's observation of the swelling. The optic nerve head in the right eye was elevated two diopters and it covered two and a half diopters. In the cases of pseudooptic neuritis he had seen there was considerable connective tissue element in the retina immediately surrounding the margin of the optic disc, which gave it the simulation of optic neuritis. However, a more careful study of the case might indicate it was not a real inflammatory process or an edematous process at the head of the optic nerve. This case had more the appearance of a real optic neuritis, and he thought it must be that.

Birth Injuries of the Eye.

Dr. C. P. Small stated that a study of recorded cases showed a general agreement in the following particulars: Practically all have followed a difficult instrumental delivery, although cases have been reported of an unusually long confinement, associated with a contracted pelvis, where injury occurred when no instruments were used. One eye alone was generally affected. The injury was usually associated with other signs of traumatism, as abrasions of the skin, subconjunctival or retinal hemorrhage, hyphemia, etc., and that a more or less characteristic form of corneal opacity was usually present. The most frequent of all forms of birth injuries are those involving the cornea.

After going extensively into the literature of birth injuries of the eye, Dr. Small reported the following case:

The patient was eleven years of age, the younger of two children. Her mother says it was a breech presentation, that

after a very long and painful confinement she was given chloroform, and the child delivered with forceps. There was an extensive perineal laceration. The child weighed fourteen and a half pounds. At the present time there are scars on both sides of the head over the parietotemporal areas, made by the forceps, the one on the right side showing that the wound had been deep, while the tip of the same blade cut the lower right eyelid, resulting in the scar which was shown by a drawing. There are three distinct linear opacities extending vertically across the entire cornea. In addition to the corneal injury there is a partially opaque lens, dislocated upwards, the tremulous iris which accompanies this condition, atrophy of the optic nerve, and a slightly increased intraocular tension. Vision was reduced to counting fingers at four inches. Vision in the left eye, with a $+ 0.50$ cylinder, axis 90° , is 20/20.

The lower edge of the lens appears less curved than usually appears in this condition, and much darker in color than the remaining portion of the lens. A similar condition was seen in a case reported by Wurdemann, where there was a partial upward dislocation of the lens. A brown line extended across the lens, evidently the remains of a blood stain from a hyphemia which was present after birth. In addition to the cases already mentioned, this peculiar and unusual form of linear opacity, due to rupture of Descemet's membrane at the time of birth, has been observed by Braav, Green, Henderson and others.

Discussion.—Dr. Wesley Hamilton Peck had seen a case of birth injury of the eye similar to the one reported by the essayist. He exhibited a case to the society several years ago of extreme proptosis following delivery. Subsequently the condition receded and the eye assumed a normal position.

Dr. J. Sheldon Clark stated that two weeks ago he was called by a general practitioner to see the case of a young child some three days old, presenting a peculiar condition of the cornea. The cornea looked as white as though carbolic acid had been dropped on it. The doctor was perturbed in regard to it, and asked whether delivery had anything to do with it. In looking up the literature he had found there were such cases. However, the condition cleared up in three or four days' time.

Dr. Small, in closing, stated that in his paper there were a number of references to other forms of birth injuries, espe-

cially those of the cornea and temporary opaque opacities. There was one case reported where the eye was partially lying on the cheek at the time of birth. There were also cases of strabismus from injury of the muscle, as well as in other portions of the body. All these came under birth injury proper.

The Sclerocorneal Seton in the Treatment of Glaucoma—A Preliminary Report.

Dr. Casey A. Wood stated that without attempting at this time to develop or discuss the arguments for such a desirable end, after some preliminary lower animal experimentation, the operation he was about to describe was done on two human subjects. The results were so encouraging that he now presented one of the subjects operated on and hoped the method might commend itself to the judgment of the members so as to give it a trial.

For the purpose of this experiment cases were chosen that had failed of relief at his own and at other's hands by the usual operative measures.

The first case was that of a boy, aged eleven years, first seen on November 28, 1913. About two years previously he bumped his left eye against the corner of a chair. A concussion cataract formed, which was removed by another ophthalmic surgeon. Some thickened capsule remained. Three months afterwards there was much pain in the eye when the surgeon did a large, upward iridectomy, for the relief of glaucoma. Since then the vision had become steadily worse, and the mother thought the eyeball had grown larger. The patient had had attacks of pain in the left eye for some time, and the vision was reduced to perception of hand movements. As the tension remained plus 1, an Elliot trephining was done, under nitrous oxid gas and ether, on December 11, 1913. The operative wound healed nicely, and the patient did fairly well until about three months ago, when the pains and discomfort in the left eye returned and the tension again rose to plus 1. The patient's tonsils and some adenoids were then removed, without effect upon the ocular situation. A month ago a scleral seton was introduced. The reaction was inconsiderable, and drainage had since been well established. Tension was now normal, both under finger pressure and by tonometric readings.

Dr. Wood reported a second case, and then described the procedure he had adopted in these two cases, as follows:

The eye is carefully rendered as aseptic as possible and the pupil is contracted by eserine. A narrow Graefe knife, with a hole near its point, is introduced and passed in precisely the same fashion as in the preliminary step of an anterior sclerotomy. The puncture and counterpuncture are made entirely in the sclera, but as near the clear corneal margin as possible, so that at least one-half the operative wound communicates with the anterior chamber. When the point of the instrument emerges from the globe at the counterpuncture, one needle of a double armed, white, 00 braided silk suture, about eight inches long, is passed through the hole in the knife point. After a number of trials it was found that a half curved needle is better adapted to the purpose than a straight one. It should be just large enough to pass easily through the eye of the knife, and should not be more than two-thirds of an inch long. Thus armed, the knife is withdrawn, so that about the same lengths of double sutures protrude from puncture and counterpuncture. The knife is now freed from the sutures with scissors, and the first needles are separately passed with a needle holder (by way of the counterpuncture wound), in different directions and for the length of the needle, beneath the ocular conjunctiva. The loose ends of suture corresponding to the puncture opening are then threaded, and the same maneuver is practiced on that side. The so-called split or patent eye needle is most useful here, since a wet, sterilized suture can be immediately threaded upon it; otherwise valuable time is sure to be lost in vain attempts to pass damp threads through the eye of the ordinary needle.

It matters not what form of anesthesia be used, but it is well to employ a mixture of cocaine and adrenalin locally to stanch the bleeding from the scleral wounds.

Dr. William A. Mann asked Dr. Wood if he put in a double thread. In most of the operations only one thread was used. Personally he thought a double thread was better. He would also like to ask as to the kind and size of the silk.

Dr. Wood, in reply, said that if one thread corresponding to two filtration area tracts be good, he thought four would be better than two. He really had that in mind when he thought of utilizing the double ends of the suture. Where

we get four tracts or four canals, he thought there was or might be some additional irritation. He did not believe, however, a double thread would irritate more than a single thread would.

As to the kind of thread used, he had employed different sizes in animals, but he used a double knot braided silk thread—white. The size was 00.

PAUL GUILFORD,

Secretary.

COLORADO OPHTHALMOLOGICAL SOCIETY.

Meeting of March 20, 1915. Dr. E. E. McKeown presiding.

Dr. Edward Jackson stated that he was in receipt of a letter from Dr. Julius Hirschberg, in which he said that he had completed his book on "American Ophthalmologists," and that he would be pleased to inscribe same "To the Colorado Ophthalmological Society." The society appreciated the honor and accepted it.

Macular Lesions.

Dr. Melville Black presented a man, age seventy-six years, good habits, neither drinks nor uses tobacco. Has mitral lesion. Blood pressure 150 mm. Hg. Vision, right eye, 10/200; left eye, 20/70. The doctor did not find enough apparent trouble to account for lowered vision.

Discussion.—Dr. Edward Jackson thought he found distinct, though minute, lesions of the macula of each eye. Choroidal vessels show clearly, which renders macular changes more difficult to see, but he feels quite sure that they are there.

Dr. G. F. Libby regards the condition as that of senile changes in the maculae.

Dr. W. C. Bane said there seems to be a disappearance of the pigment epithelium. Discs look atrophic, and he believed such was the process.

Dr. E. R. Neeper: I believe that we are inclined to take advantage of "senile changes" and use the expression much as we do the term "idiopathic," to cover our ignorance. I believe that all such cases should be thoroughly worked out.

Dr. Black stated that all laboratory investigation had been made.

Iritis With Optic Neuritis.

Dr. Melville Black also presented a man of thirty-five years, who one year ago seriously injured left eye by steel; eye recovered but is practically blind. Seven months ago contracted syphilis and was treated with mercury. One month ago vision of right eye began to fail. Examination revealed posterior synechia, which under atropin gave way in three

days; pupil is now about half dilated. When first seen the eye was not congested, but later became so. Optic nerve was found to be swollen, with the veins three times their normal size. Eighty grains of atophan has been given every other day for the past two weeks, and the patient has been on mercury inunction; no improvement for the past week.

The case is one for differential diagnosis, as the question naturally arises whether this is of specific or sympathetic origin; my opinion is that it is the former.

Since the meeting the patient has been placed upon one teaspoonful of saturated solution potassium iodid three times a day, and this with the inunctions have caused the pain to cease and brought about great improvement in the whole condition.

Discussion.—Dr. Edward Jackson said that it looked to him like a syphilitic trouble. He mentioned a case in which there had been iritis and neuritis coexistent.

Dr. E. R. Neepor suggested that another Wassermann be made, and Dr. E. M. Marbourg suggested that another luetin be made.

Lowered Vision—Hazy Vitreous.

Dr. W. F. Matson presented a man aged sixty-six years. Vision, right eye, 20/120; left eye, 20/100. No serious illness and no external eye disease. Present trouble began four years ago with blurred vision. Later, headache began to occur, which is now severe and of the occipital type. Pupils are not circular. No synechia. Fundus details not clear. Urinalysis negative. Blood pressure 150 mm. Hg. Not improved by glasses.

Discussion.—Dr. Melville Black said that it was rather an obscure case. Vitreous is hazy, and it is to this that he would attribute the reduced vision. There is slight excavation of the nerve heads. Suggested that the patient be taken off potassium iodid and given protoiodid for a time and then resume potassium iodid.

Dr. W. C. Bane said that he got a good view of the discs; slight cupping, but no atrophy. Wavy appearance of the cornea suggested that cocain had been instilled, but none had.

Dr. E. R. Neepor asked how the tension was. Dr. Matson replied that it was normal.

Congenital Ptosis.

Dr. G. F. Libby presented a man, age twenty-one years, with congenital ptosis and palsies of the external muscles of the eyes; nystagmus. In attempting to elevate the eyes the right goes higher and there is excessive convergence. Vision, right eye, 5/12 W plus 1.50 sph.; left eye, 5/8 W plus 1.50 sph.

Patient is the only one of five brothers who has bad eyes. Of two sisters, one has worn glasses.

Specific Iritis.

Dr. W. C. Bane presented a man, twenty-nine years of age. Inflammation of right eye began March 6th, at which time the vision of each eye was 5/5. Pupil of left eye adherent at the lower margin. Later, circumcorneal injection increased and vision dropped to 5/10 in the right eye and 5/7½ in the left eye. Wassermann negative; denies infection. Treatment consisted of atropin, aspirin, protoiodid and hot fomentations, under which rapid recovery is taking place.

Discussion.—Dr. Melville Black said that notwithstanding the denial of the patient, he believed it to be specific.

Retinal Hemorrhages.

Dr. Black reported the case of a man, age twenty-nine years, a Wyoming ranchman, big and strong, and apparently in the best of health, who had been having headaches, and who came to him for glasses. Ophthalmoscopic examination revealed numerous small retinal hemorrhages, with some spots showing that former hemorrhages had undergone absorption. Vision 20/70 in each eye; blood pressure 220 mm. Hg. Sent the man to an internist, who reported the finding of albumin, hyaline and granular casts. The man had had scarlet fever ten years before, which was probably the origin of his present kidney trouble.

My object in reporting this case is to observe that had this man consulted an optician, his serious condition would have probably remained unrecognized until too late to do the little that can now be done.

Neuroretinitis.

Dr. Black also reported the case of a girl of eighteen years, who had had to give up housework because of violent headaches. Neuroretinitis was found. This case is of interest

because of the age of the patient and the probable prognosis, which at best is bad.

Discussion.—Dr. E. R. Neepor cited the case of a healthy looking young man in whom he had found the eye grounds in similar condition.

Subconjunctival Hemorrhages.

Dr W. A. Sedwick reported the case of a woman, aged forty-eight years, with large subconjunctival hemorrhages, which seemed to increase at night and decrease during the day, and gradually involved one-half the sclera. Diastolic pressure, 216; systolic, 240 mm. Hg. Gave chloral, four grains t. i. d. After the sixth day this was reduced to one dose a day, and then gave two drams syrup hydriodic acid three times a day. March 13 the diastolic and systolic pressures were 164 and 190 mm. Hg. respectively.

Keratosis Nigricans.

Dr. E. T. Boyd: The patient whose case I am about to report promised faithfully to be present tonight, and because of the rarity of the condition, only about fifty cases having been reported, I regret her failure to keep her promise.

A woman, fifty-four years old, consulted me March 13th with regard to the condition of her eyes, which were running water and causing her much mental anguish because of their unsightly appearance. On the margin of the right lower lid there were two large papillomata, their bases merging. A large papilloma at the inner corner of the right upper lid. In the inner corner of the left eye, arising from the caruncle, there was a large papilloma and it was this one in particular that was giving her the most trouble.

Two years ago, being troubled with constipation and hemorrhoids, at the suggestion of a friend, she began using injections of salt and water, using, according to her statement, "salt by the handfuls." This she did once or twice a day for a long period of time; her mouth began to trouble her and she consulted a dentist, whom she quickly quit and was then treated by a Christian Science healer. Ten months ago papillomata began to appear on the extensor surface of the forearms, to a lesser extent upon the arms, and in great profusion upon the back of her neck, and in the latter place

there is now marked pigmentation. There is now a papilloma in one external auditory canal and a mass, probably papillomatous, in the roof of the mouth well forward and flush with the biting surface of the teeth, that has the appearance of fine grained granulation tissue. She has lost thirty pounds in the last ten months and is in a deplorably despondent mental state, so it is difficult to say whether this loss and her cachectic appearance is entirely due to a cancerous lesion or largely the result of mental worry.

Though this is not a frank outspoken case, it should be diagnosed, following Crocker's classification, as *keratosis nigricans*, or following Stelwagon, edition of 1914, as *acanthosis nigricans*.

Speaking of this disease, Couillard, under the supervision of Darier, arrives at the following conclusions: "The disease is a syndrome dependent upon abdominal carcinosis and characterized, (1) from a clinical viewpoint, by: (a) A papillary hypertrophy and a cutaneous pigmentation having an essential regional character; (b) papillary hypertrophy of the mucous membrane; (c) dystrophy of the hair and nails; (d) absence of desquamation; (e) existence of cachexia. (2) From a pathologic standpoint, by carcinomatous degeneration of the abdominal organs. (3) Histologically, by lesions of hypertrophy and pigmentation in the rete and corium."

The above clearly suggests the line of treatment, which may be either expectant or surgical; but from the standpoint of the ophthalmologist when the eye or eyelids are involved, as in this case, there can be but one course to pursue, and this coincides with the advice of Crocker in treating of *keratosis nigricans*, when he says: "Remove any wart or papillary growths which, from their position, are a special annoyance."

It is not impossible nor unlikely that the absorption of large quantities of sodium chlorid over a long period of time may have so modified metabolism as to have become the prime etiologic factor in this case.

Meeting of April 17, 1915. Dr. W. F. Matson presiding.

**Injury of Right Eye, With Sympathetic Inflammation Six Weeks
Later in Left Eye.**

Dr. Melville Black presented a man of twenty-seven years, who had injured his right eye, six weeks later sympathetic

inflammation developing in the left eye. The right eye had been removed five days after the onset of sympathetic trouble, but the change in the sympathizing eye had progressed to the formation of cataract, seclusion and occlusion of the pupil, slightly lowered tension, but perception and projection of light remained good. The patient wished to know if anything could be done to partially restore vision.

Discussion.—Dr. C. E. Walker said that operative procedure would probably cause the loss of the little vision he had.

Dr. D. A. Strickler, because of the reduced tension, would leave it alone.

Dr. E. R. Neepor believed that he would do a careful needling.

Dr. W. C. Bane would leave the eye alone.

Dr. Edward Jackson would be inclined to leave the eye alone, but cited a case similar that had been operated four or five times with a good result. He said, however, that should he decide to operate he would remove the lens.

Dermoid Cyst of Right Eye Involving Portion of Conjunctiva and Cornea.

Dr. Black: The cyst was eight millimeters long by six millimeters broad, located horizontally and externally. Although classical in that it involved both corneal and conjunctival tissue and had hairs growing from it, such a case is sufficiently rare to make it of interest and worthy of examination. Dr. Black also showed two sisters upon whom he had operated for trachoma.

Scleritis in a Woman Forty-two Years Old.

Dr. Black presented a woman who came under his care during his service at the clinic, December 30, 1914, with scleritis in both eyes. The inflammatory condition occupies all of the exposed sclera of each eye. Corneae clear. Pupils dilate under atropin, but not widely. Eyes inflamed for one year; worse during menstruation. General health is and always has been good; she looks to be in perfect physical condition.

Laboratory Tests.—Urine, negative. General reaction to tuberculin test, strongly positive. Wassermann, negative; luetin test positive, and cobra venom test positive.

Treatment.—She was put on tuberculin injections, keeping

below the reaction point, and given Griffith's mixture. Improvement for a time was marked, then she began to get worse. Given atophan, seventy-five grains daily for three days, which after an interval of rest was repeated without lasting improvement.

Question: In view of the positive luetin and cobra venom tests, should we, in the absence of all clinical symptoms and history, together with the fact that she has healthy twin children three years of age, put this woman on specific treatment?

Discussion.—Dr. W. C. Bane said that he knew of no drug that had better effect upon diseased conditions of the eye than mercury.

Dr. W. H. Crisp suggested that the condition of the teeth might have something to do with the scleritis.

Dr. E. R. Neeper would not fail to give antisyphilitic treatment. He had a similar case, however, which he believed to be due to toxins emanating from the mouth, and had given alcresta ipecac, and the patient made a complete recovery. In this case the dentist had failed to find trouble in the mouth. Very many of these cases are liable to be self-infecting, and to prevent this he had used fluid extract ipecac, in weak solution, as a mouth wash with good results.

Pemphigus of the Conjunctiva.

Dr. W. C. Bane had a patient present with the condition above mentioned who had been presented to the society before, but was now shown because of involvement of the other eye. The case was being treated by X-rays, a treatment which had proven successful in the eye first affected. Report will be made later as to the result.

Discussion.—Dr. W. F. Matson reported a case which he had had in which both eyes were affected.

Dr. Black said that the case of pemphigus was very instructive and congratulated Dr. C. E. Walker upon making the diagnosis, some years ago, at a time when the disease was in its incipency. Dr. Black also said that it would be interesting to see what effect the X-rays will have on the last eye affected, and spoke of the present method of using hard tubes and protecting the eye from burning. The doctor had never had a

case of pemphigus, but should he have, he would send it to Dr. Bane.

Retinitis Pigmentosa.

Dr. Bane presented a woman, age forty-nine years, first seen in 1895, at which time the vision was 6/21 with both eyes. Patient had had poor vision and night blindness since childhood. During the six years preceding this time, numerous illnesses had considerably impaired her already poor vision. No consanguinity of parents. Nine children in family; one other sister with similar eye defect. An aunt of her fathers' and a cousin on her father's side also had like trouble.

Examination in 1895 revealed eye reflexes normal. Movements good. Optic discs of dull, muddy appearance. Vessels small. Appearance typical of retinitis pigmentosa. Fields diminished, as shown by perimeter, to but fifteen degrees from fixation point. Red field less than that for green. Correcting lenses gave vision of 6/15 with each eye.

In 1899 patient returned, complaining that sight was failing, and upon examination vision was found to equal 6/30 in each eye.

In 1915, five days ago, she again returned, giving history of rapid failure of vision during the past six months, accompanied by pain in and behind the eyes and in the top of the head. General health has been good. Vision 5/60 in each eye. Apparently there has been an increase of the number and size of pigment spots in the right retina. Vision is limited to the central portion of the field.

Mydriasis, Dislocation of the Lens and Increased Tension From Trauma.

Dr. E. E. McKeown presented a boy, aged twelve years, who three weeks before had been struck above the external canthus with a brick. First two weeks had been treated at home. There had been no pain in the eye until two days before he had consulted the doctor, one week ago. When first seen there was circumcorneal injection, cornea slightly cloudy and to some extent anesthetic. Pupil irregularly dilated; iridodonesis, with dislocation of the lens outward. Fundus details could not be made out because of haziness of the vitreous. Tension 56 mm. Hg. Instillation of one-fourth of one per cent eserine

reduced tension to 40 mm. Hg. the first day, but this was suspended because of continuous pain and the instillation of a one per cent atropin, with hot fomentations substituted. What is best to do for the condition now present?

Discussion.—Dr. Edward Jackson said that the lens might become cataractous; that it might be well to needle the margin of the lens, as the eye would be much safer with the lens out of the way.

Dr. Melville Black called attention to the elevated tension and that the eye was inflamed and photophobic, and believed the eye to be a dangerous one. He thought that needling would have a tendency to increase tension, and therefore was of the opinion that the lens should be removed by section. There has probably been a vitreous hemorrhage; the boy now has uveitis and unless the tension is reduced vision will be destroyed.

Dr. Jackson remarked that he would not be afraid of the increased tension in one so young, as he had seen cases with tension of 50 mm. Hg. come out all right.

Dr. G. L. Strader asked why it would not be well to keep the anterior chamber open for some time?

**Steel in Vitreous—Failure to Remove It With Electromagnet—
Enucleation—Other Eye Practically Blind From
Former Injury.**

Dr. E. T. Boyd presented this man with the following data: March 24, 1915, Oscar Hill, Finlander, miner, aged twenty-seven years, consulted me with reference to injury to the right eye, which he had received two days before while pounding a drill. The left eye was fixing while the right was divergent and blind. There was marked conjunctival congestion and a small wound at the sclerocorneal junction internally. There was no perception of light, and no further details could be made out, save and except that there was no blood in the anterior chamber and a small wound at the periphery of the iris. Next morning an X-ray was taken, which apparently located a foreign body in the vitreous, close to the sclera externally, about the center of the eye from before backwards and from above downwards. My magnet was not connected with current because of moving, so I took the case to Dr. Black's office, who very kindly assisted me in

attempting to extract the foreign body. This we failed to do, and the eye was removed in the afternoon. The next day Dr. Black and I bisected the eye and found a small piece of steel in a large blood clot in the opposite half from that in which it had been located by the plate.

Incorrect location by plate, the foreign body not being actively magnetizable, as was found later to be the case, together with the fact that it was small and incorporated in a dense blood clot, all contributed toward failure in its removal by the magnet.

After enucleation a sphere of paraffin was inserted in Tenon's capsule; this remained nicely until the fifth day the wound opened, sphere presented and was removed.

Six years ago, while working in a coal mine, this man was struck in the left eye by a piece of coal, as a result of which the eye was sore for two or three weeks. After the injury the eye became almost blind and divergent. There is now anterior synechia, involving the pupillary margin of the lower external quadrant of the iris. There is posterior synechia of the central portion of the iris internally. Below, because of the antagonistic action of the adhesion, the pigment layer of the iris has pulled loose. Beginning a little above the horizontal meridian, at the pupillary margin, there is a dense white band which runs downward and outward and is connected with the anterior synechia by mediation of the loosened pigment layer of the iris. In the pupillary area there is a delicate tracery, veil-like in appearance, occupying different planes from the surface of the iris, showing that though much of the lens matter may have been absorbed, there is still some remaining. Good reflex but no details can be obtained from fundus. Perception and projection are good in all the field, and the man can recognize form at the distance of three feet.

Discussion.—Dr. Edward Jackson thought that it would be proper to try to divide the masses in the pupil.

Dr. Melville Black said that something in the way of needling was the thing to do.

Dr. W. C. Bane thought that the procedure along the line suggested should be followed, but said that he would caution the patient that he must assume all responsibility as to the ultimate result.

Corneal Ulcer.

Dr. E. R. Neeper reported an unusual case, of a man who had consulted him two weeks before with a large, clean cut ulcer of the cornea which had been treated by a general practitioner. The ulcer was about three by seven or eight millimeters. Iodin locally and iron internally caused rapid healing. The man had had no pain while the ulcer existed, but as healing took place the eye became painful; and when the cornea no longer stained, the pain was violent almost to the point of being unbearable. The doctor denuded the area formerly ulcerated and the pain ceased. Denuded surface quickly healed and the pain became excruciating. This cycle had occurred three times; the cornea was now covered by epithelium and the pain violent. Dr. Neeper attributed the pain to involvement of the nerve terminals, but wanted suggestions as to what should be done.

Discussion.—Dr. C. E. Walker had had a similar case in which bandaging was the only thing that gave relief.

Dr. W. C. Bane suggested that the ulcer be cleaned out with a spud.

Dr. G. L. Strader recommended that trichloroacetic acid be applied.

Corneal Wound.

Dr. J. A. Patterson reported the case of a man who, in attempting to make his watch run, released the main spring in such way that he received a severe cut of the cornea, and pointed the moral that it were sometimes better to consult a watchmaker.

Arteriosclerosis.

Dr. E. R. Neeper cited the case of an active woman, aged sixty-two years, showing arteriosclerosis with blood pressure of one hundred and eighty-two, urine negative, whom he had referred to an internist, and the pressure was now 162 mm. Hg. Should the pressure be still further reduced?

It was the consensus of opinion that the pressure should not be further reduced.

E. T. BOYD,
Secretary.

OPHTHALMIC SECTION,
ST. LOUIS MEDICAL SOCIETY.

Meetings of November 4, 1914, January 6, 1915, and
March 3, 1915.

Erythema Multiforme With Conjunctival Involvement.

Dr. M. C. L. Barnett reported the case of Mr. K., aged twenty-six years, first seen October 26th, after having been injured in the left inguinal region, for which he was confined to the hospital for three weeks. He had intense burning in the eyes. The following morning they were swollen and red, with an eruption on the lower lids which extended over the margin onto the conjunctiva of the cornea. The second day a similar eruption appeared upon the neck and dorsal surfaces of the arms, and later on the mucous membrane of the mouth. The patches varied in shape and contour, but increased in size, for three days. He was given iodid of potassium, fifteen grains three times a day, and sodium sulphat, one-half dram to the ounce of water, was applied locally. Eight days after coming under treatment he returned home.

**The Operative Treatment of Chronic Dacryocystitis—Case Report,
Presentation of Patient and Specimen.**

Dr. C. W. Tooker spoke of the historic side of chronic dacryocystitis, cited the various operative procedures, and reported the case of Mrs. B., aged thirty years, who saw him on October 31, 1914, stating that the tears had run over her face from her right eye for seven years. She had a chronic dacryocystitis. Several attempts were made to dilate the tear duct without success. Seven days after her first visit the sac was removed, and, although her eye is still filled with tears, he looks upon it as a cure.

**A Case of Fracture at the Base of the Skull, Ocular Signs—
Presentation of Patient and Skiagraph.**

Dr. C. W. Tooker reported the case of Mr. S., aged twenty-two years, who was first seen October 8, 1914, with a history that three weeks previous he had been thrown from an auto-

mobile against a post, striking his head. Was unconscious for a day, then found that he did not see as well with his right eye as formerly. Dr. W. A. Shoemaker on October 8th found atrophy of the right optic nerve with vision of 13/200, not improved by glasses. The vision of the left eye equaled 24/30. Diagnosis was fracture of the base of the skull, which was later proven by a skiagraph. After having been on full doses of strychnin, his vision on December 19th, was 13/40 in the right eye and 24/30 in the left.

Some Convenient Stereoscopic Figures.

Dr. W. E. Shahan gave a detail description of some new convenient stereoscopic figures for testing crosseyed children.

These charts are simply constructed. Have a number of blank cards cut out of a size that will fit into the holder of your stereoscope. Through the center of each of these draw a vertical line. On either side of this vertical line draw three parallel vertical lines, one thirty millimeters from the central line, another thirty-three millimeters from it, and the last thirty-six millimeters from it. There will then be three pairs of parallel lines measured from the central line—the outer pair will be seventy-two millimeters apart, the middle, sixty-six millimeters apart, and the inner, sixty millimeters apart. Six identical seals are used for each chart; two of them are placed over the outer lines, two over the middle ones, and two over the inner ones, each pair being on the same horizontal line. The seals will then be respectively seventy-two, sixty-six and sixty millimeters apart in horizontal lines. In the vertical direction there should be about five millimeters between each pair (design illustrates a convenient arrangement). When these, arranged in this way, are observed through the stereoscope by a patient with binocular vision, the seals farthest apart will appear largest and farthest away from the patient, while those nearest together will appear nearest the patient and smallest. The intermediate ones occupy an intermediate position. In using these tests with children, simple direct questions should be asked: "Which is the closest to you?" "Is the top one right straight over the bottom one, or a little to one side?" The answers to these questions will indicate definitely whether the patient has or has not stereoscopic vision.

Complete Left Hemianopsia With Glycosuria, the Result of Slight Trauma.

Dr. F. E. Woodruff stated that Mr. J., aged sixty-six years, while walking on the street the latter part of August, 1914, slipped and nearly lost his balance, which, however, by strong muscle effort he regained. A few minutes later it was found that he could not see things on his left side.

Examination of the patient showed a well preserved man with normal heart and lung action, with a blood pressure of one hundred and fifty. Excretory and secretory organs apparently functioning normally. Normal gait and posture, except slight inclination to turn the head to the left. Reflexes normal, appetite and sleep also as usual, no deviation of the tongue on protrusion, cheeks inflated normally, equal strength on both sides of the body. Examination a few days after the accident showed large quantities of sugar.

Vision, right and left eye, each 20/12; no ametropia. Presbyopia corrected with a $+ 3.00$. Muscle balance, reflexes and fundus absolutely normal. Fields showed left lateral hemianopsia, complete for both form and color, with retention of the central field about ten degrees. Right sides of the fields normal, but no hemiplegia, no anesthesia, no aphasia and no ataxia.

Demonstration of Fixation Forceps.

Dr. J. M. Ball demonstrated a new fixation forceps, which he claimed had many advantages. First, that the blades were placed at right angles to the handle, making it easier to catch the muscle; second, that one blade is smooth, and third, that the instrument is closed by means of a sliding catch.

PHILADELPHIA POLYCLINIC OPHTHALMIC SOCIETY.

Meeting held February 11, 1915.

SYMPOSIUM ON MYOPIA.

The Causes of Myopia.

Dr. W. Walter Watson said that the causes of myopia were to be found in the habits that civilization had fixed on man. All changes that lead to myopia, however, were not attributable to close use of the eyes. He arranged several classifications: a variety either congenital or acquired, and a division of causes into anatomic, mechanical, inflammatory, constitutional and traumatic. The congenital form does not signify that near-sighted children are the offspring of myopic parents, but a tendency under the laws of heredity by which a child inherits from its parents, and more especially myopic parents, the peculiar conformity of skull or weakened tunics of eyes that predispose to its development after birth. Myopia in the embryo by hyperinclusion of the mesoblastic vitreous into the secondary optic vesicles is uncertain, and the congenital inflammatory types are rare. Myopia exists where parallel rays entering the eyes focus anterior to the retina; therefore, it occurs when the anteroposterior diameter is disproportionate to the refractive power of the dioptric media, or when there is unusual excessive curvature of lens as in cataract formation, or of the cornea as in conical cornea. With anatomic causes are placed imperfections of orbit development in the vertical diameter, and the low orbit producing by muscle pressure posterior bulging of globe. Also the shape of skull and the size and conicity of the orbit are here considered. Broad heads give wide-set eyes, and shallow deep orbits promote resistance to ocular movements and an anomalous arrangement of the rectus muscles whereby on extreme convergence lateral compression of the globe is produced. This extreme convergence is brought about by demands of civilization, occupation, poor lights in school and workshop, and small type in print. Associated with this excessive convergence is the

excessive accommodation which is in turn encouraged by near vision; for near vision, while theoretically possible without much accommodation in the myope, is not usually accomplished. Therefore, myopia uncorrected by glasses is a contributing cause to the progressive form. Next in importance was mentioned the inflammatory causes which move toward a devitalization of the tunics and consequent stretching of the eyeball. Contributory are: iritis, cyclitis, choroiditis, scleritis, inflammation of adjacent tissue, infectious fevers, diabetes, and interference with the choroidal circulation by pressure on the vena vorticiosa.

Among other causes Dr. Watson mentioned mild ectatic cicatrices, unusual short optic nerve, alterations of vitreous changing its index, sclerosing of the crystalline lens, and luxation of lens, while last but not least he referred to uncorrected astigmatism by reason of its strain on the ciliary muscle with an enduring irritation.

The Prevention of Myopia.

Dr. Luther C. Peter: It is generally conceded that ninety per cent of myopes are due to acquired causes, and that the ninety per cent can be prevented. It is difficult to measure just how much one can do to prevent myopia. Donders classifies myopia into three groups. First, stationary; second, temporarily progressive; third, permanently progressive. In the latter group are included the malignant types.

The prevention of myopia resolves itself into a question of hygiene: First, in the home; second, in the school; third, industrial hygiene.

In home hygiene, such measures as will help the child's general health are essential. Roemer likens the condition to rickets, and uses the term "scleral malacia" to express the condition. It seems to me this term is very appropriate. In children, therefore, with myopic tendencies it is essential to pay strict attention to home hygiene, as they inherit the same tendencies and habits which made their parents myopic. Anything that will improve the children's general health is to be encouraged.

Dr. Samuel Risley has called attention to one of the great factors in the development of myopia—that is, astigmatism. It is not unusual to see these cases pass from hypermetropia

to myopia by the astigmatic route, or, as Dr. Risley expresses it, "through the turnstile of astigmatism." I believe that astigmatism has more to do with the development of myopia in the first and second of Donders' classes than any other factor.

Mixed astigmatism is but an expression of the same tendency, as mixed astigmatism primarily resolves itself into simple hypermetropic astigmatism. It is a well known fact that children are born hypermetropic and remain so through life. Myopia is therefore a condition of civilization.

Home Hygiene.—Aside from the general management in the bringing up of the child, I do not think there is anything especially indicated in home hygiene except the care in home work and the age at which the child shall be sent to school. Home study is not indicated in the average child until it is twelve years of age, and the children with myopic tendencies should not be sent to school until they have reached the age of eight years.

School Hygiene.—Since the pioneer work begun by Dr. Samuel Risley in 1881, so much good work has been done in the question of proper lighting of school buildings, arrangement and height of the desks, position of the child, etc., that we need not discuss this phase of the question. Every child should have its vision taken accurately at least once a year, and efforts should be made by competent persons to determine the presence or absence of astigmatism. These measurements should be made by an ophthalmologist. If astigmatism is present, it should be corrected. The spheric element is not of so much importance at this time of life as the astigmatic error.

Myopic children should have special classification in the school. Their time spent in the school room should be limited, and the amount of work required of them should also be limited. It is a well known fact that the most progressive period of myopia is from eight to fifteen years, and if the proper care is taken of the child during this period, the progress of myopia can undoubtedly be arrested.

Industrial Hygiene.—This is a matter of education and training. While the average manufacturer is not a humanitarian, he has enough of the humanitarian spirit, when coupled with the usually astute business foresight, to accomplish the object of the betterment of the condition of the employed

without intervention on the part of the physician. The modern factory is built with due consideration for the employed. I believe, however, that there should be a minimum standard of visual acuity in order to obtain the best results. Employees whose vision falls below this standard should be required to wear glasses.

The Treatment of Myopia.

Dr. George S. Crampton, in outlining the treatment of myopia, drew attention to the fact that a solution of the proper treatment had been largely reached when due consideration had been given to the etiology of the condition, together with the institution of certain hygienic preventive measures known to successfully combat an increase in the defect.

While a careful refraction under a reliable cycloplegic such as atropin should first receive attention, our responsibility does not cease here, but our efforts should be directed toward the correction of the faulty habits of the patient. We know the myope to be of the student type, the child who prefers to continue with his books during the recess hour, in preference to joining his playmates in the vigorous sports which require clear distant vision.

In the progressive types of myopia it is well to prevent all tendency to a stooping position by supporting the printed page in a vertical manner but little below the level of the eyes, and the patient should live under conditions as far removed as possible from the confining influences and literary environment of civilization.

The balance of the extraocular muscles should be determined, and the myopic tendency to divergence, if present, should be combated by muscle exercises or, in certain cases, by prisms or operative measures, if indicated.

The blood and urine should be examined in a search for treatment indications, and the diet should receive attention in order that everything possible may be done to increase the general vitality and muscle tone. A tendency to constipation, if present, should not be overlooked.

Risley, who in 1881 examined a large number of the eyes of children in the Philadelphia schools, concluded that given an emmetropic eye, no harm would follow the educational process, if proper hygienic measures were adhered to.

That improved hygiene, together with the benefits of a prompt correction of the refractive error, are bearing fruit, can be judged by Widmark's experience in Sweden, where he found a reduction in the number of myopes in the schools from about forty per cent of all those examined in 1880 to nineteen per cent in 1908.

In London, Harman found less than three per cent myopic after the first five years of school life, but there was a decided trend from hyperopic astigmatism to myopia as time went on, indicating that hyperopia was passing over into myopia.

Weeks divides myopes into three classes: (1) Those to whom full correction may be given for all purposes. These are the cases in which not more than two-thirds of the accommodative power will be employed in close work when glasses are worn, the necessity for undue convergence being thus lessened. (2) Cases in which a full correction for distance can be used with comfort, but whose reserve accommodative power in doing close work should be less than one-third. These cases must have weaker glasses for near work than those worn for distant vision. (3) Cases in which the glasses for near vision only can be worn with comfort. These are the victims of high myopia in whom the punctum remotum is extremely close to the eyes. In these cases the full correction so reduces the size over that to which the patient has been accustomed, that the benefits of clear distance vision are more than outweighed by the annoyance occasioned. Glasses that will remove the punctum remotum to the ordinary reading distance, namely, thirty-three to forty centimeters, will often be worn with perfect comfort and will be preferred for all distances. A special glass may be provided for occasional use, when clear distant vision is desired.

When myopia of high degree has been long neglected, it is sometimes found that only a poor approach to normal vision can be had with glasses. This is generally due to choroidal changes following the stretching of all the coats of the eye, but cases are occasionally found where the nerve has become atrophic, and, of course, we are more or less helpless to improve the condition. Glaucomatic symptoms are also occasionally found in the long eye of myopia, and when discovered should be treated with miotics.

Eyes previously emmetropic have been known to become

myopic during an attack of glaucoma, and have returned to normal after iridectomy. Much has been written in recent years in favor of lens extraction in myopia of high degree. The preferred method of operation seems to be free dissection, followed, after one or two weeks, by evacuation of the lens substance. .

Apparently no one advises operation in errors less than fifteen diopters, and most authors prefer to reserve operation for cases of a still higher error, on account of the resulting hyperopia.

A Few Cases Illustrating Ocular Symptoms in Nervous Diseases.

Dr. John H. W. Rhein: Case 1.—A man of forty-three years presented nothing of interest in the family or personal history except that he had had spinal meningitis. In 1910 he consulted an oculist for double vision, which disappeared. He remained well until September, 1913, when double vision returned and he complained of pains in his feet. On examination it was found that his knee jerks were normal, his station good, the finger to nose test was performed perfectly well, all forms of sensation were intact, and there were no bladder or rectal symptoms. He was referred to the eye department, which reported slight palsy of the external rectus only at that time. I did not see him again until comparatively recently, when I found upon examination that his pupils were irregular, that the left pupil did not respond to light and the right one only sluggishly. There was also a palsy of the left inferior rectus and left ptosis; otherwise the examination was entirely negative. The Wassermann reaction on several occasions was negative, and I believed I was dealing with a case of non-specific Argyll-Robertson pupil.

A number of cases showing Argyll-Robertson pupil have been reported in literature. Felix Rose collected a number of these cases and published them in the *Semaine Médicale*, December, 1912. Only recently I obtained a faintly positive Wassermann reaction in this case, and under iodids and mercury the ptosis disappeared, and the double vision has almost disappeared. There has been no change, however, in the Argyll-Robertson pupil.

Case 2.—This case is shown mainly on account of one symptom which is present, namely, hemianopsia. He applied

in April, 1914, to the clinic with the history that a few months previously he suffered from an attack of paralysis of the left side of the body. When he was examined at the clinic the paralysis had entirely disappeared, so that he could use his hand in his work, and he walked without any evidence of paralysis. The tendon reflexes were increased on both sides, and more so on the left. The symptom in this case which was especially interesting was the persistent pain of which he complained in the left arm, leg and face. This led to a diagnosis of hemorrhage into the optic thalamus, which was confirmed by the report from the eye department that he had a hemianopsia. He did not have a typical thalamic syndrome, however, there being no hemiataxia, hemiathetosis or sensory disturbances. This case is an example of central pain. The most frequent seat of injury in these cases is the optic thalamus, although the central pain may be present in injury to other parts of the brain.

Case 3.—This is a case of major hysteria. The eye symptoms consisted of hysteric amaurosis, hysteric unilateral ptosis, monocular polyopia and tubular fields. In addition to this, she exhibited hemihypalgesia, paralysis of the anterior tibial group of muscles on the left side and cataleptic attacks. All these symptoms were cured by hypnotism except the polyopia, which still persists. The subject was a girl of fourteen years.

Case 4 showed hysteric symptoms, mainly on the part of the psychic sphere. She has a morbid interest in her physical sensations, daily has some new symptom, consisting of either pains in various localities, or believes she has cancer, typhoid fever, or some obscure stomach disturbance or whatnot. She has hemihypalgesia, but otherwise her physical examination resulted in normal findings. On the part of her eyes, she showed marked contraction of her fields of vision with weakness of the muscles of the eye, giving rise to double vision. Prof. Reber reported that she had seven degrees of hyperphoria. All of her symptoms are improving under treatment.

Discussion.—Dr. Samuel D. Risley said that he agreed in most respects entirely with what had been said. There is no chapter in ophthalmology which requires more close work and good judgment than myopia.

Before he published the work on school hygiene, he had a

number of cases in which he himself had seen the astigmatism increase. He found them to have a static myopic refraction. He published them in order to fortify the statistics. All are familiar with the findings of that report in a general way, and after all these years he has seen nothing that would cause him to change a single thing in that report. The gratifying part about it has been that there has been a steady dropping off in myopic eyes, eyes which had been blinded by choroidal atrophy, etc. He thinks our management of the medical science in these cases has been of more importance than all the operations we have performed.

There are many things to be taken into consideration in the treatment of myopia. The myopic eye is a sick eye. They have fluffy eye grounds and dilated arteries. They are uncomfortable, particularly in a way we do not stop to consider. A myopic eye with astigmatism upsets the balance between the eyes—not only the accommodation, but it upsets the range and convergence. And it is this fact, he believes, in many cases that accounts for the nervous symptoms we see in patients with this kind of eyes. Therefore, he believes cycloplegia should not be used for only an hour and the patient then refracted, but day after day until it often goes into weeks, and having quieted the choroid down by subjective methods, then prescribe glasses. He could relate case after case in which after the vertical deviation was corrected the difficulty disappeared at once.

Dr. William Zentmayer said that while he advocated the full correction of myopia, nevertheless there are individual cases in which it is either unwise or impossible to follow this procedure. As an illustration of the first, he cited cases in which there were myopic changes in the fundus, and sick, irritable eyes. In these cases it will often be found that patients are much more comfortable with a partial correction, which gives less bright images. He gave the notes of a patient in whom the expedient of giving a partial correction instead of the full correction, which the patient had been wearing, changed her from a recluse to a useful individual. Finally, myopes with considerable esophoria are often more comfortable with a partial correction. As an illustration of the second, he cited cases of moderately high myopia who had reached the age of twenty-five to thirty years before taking to glasses.

These patients rarely can wear full correction with comfort because of deficient accommodative power.

He agreed with Dr. Peter, that the accommodative act was not the most important factor in causing increasing myopia. Hypermetropics of considerable degree are compelled to use excessive accommodation, but such eyes rarely show the changes met with in the stretching eyes of progressive myopia. Again, myopes of two and one-half to four diopters often use their eyes for near work without glasses, and consequently without accommodation, yet such eyes may develop progressive myopia. There is some factor besides the intra- or the extraocular tension underlying progressive myopia—possibly a malacia of the tunics, sometimes inherited.

W. WALTER WATSON,
Secretary.

WILLS HOSPITAL, OPHTHALMIC SOCIETY.

Meeting held February 4, 1915. Dr. S. Lewis Ziegler, chairman.

Paralysis of Intra- and Extraocular Muscles Following Asphyxia at Birth.

Dr. William Campbell Posey presented a child six months old with paralysis of both external rectus muscles. The condition was attributed to asphyxia at birth, the child being born with the cord wrapped about its neck. The child apparently sees, for it will follow the movements of the hand. Ophthalmoscopically, there is nothing abnormal except undue pallor of both optic nerves. There is pupillary inequality, the pupil of the right eye being the larger one day, and that of the left the following day. Once, during the examination, the child's face became cyanotic, and continued in this condition for several minutes. The mother states that this may occur several times during the day. Dr. Spiller, who studied the case, thought that the asphyxiation might have caused cerebral hemorrhage, but that it had more likely led to cellular degeneration. The absence of spasticity and paralysis shows that the cerebral cortex is not generally affected. The patient is taking syrup of hydriodic acid.

Foreign Body in the Lens.

Dr. Posey also exhibited a young man from whom he had recently removed a fragment of steel that had been imbedded in the capsule of the lens, with the result that normal vision was secured. The points of interest in the case were the absence of all inflammatory or reactive signs following the entrance of the foreign body, through the limbus, into the eye; the glistening appearance of the foreign body, as it lay in the pupil, on the anterior capsule; and the slight haze that remained in the capsule after the removal of the fragment with the magnet.

Foreign Body in the Vitreous.

Dr. Posey showed a second man from whose eye he had removed a foreign body. This was a fragment of steel, taken from the vitreous on the previous day, by means of the Haab

magnet. He had chosen this instrument in preference to the weaker magnets on account of the small size of the foreign body and the position of the wound, which was a jagged one of the limbus; and because the accident had happened but a few hours previously. An incision through the sclera nearest to the position of the foreign body, as shown by the X-ray, would have produced greater traumatism, and could not have been performed without the etherization of the patient.

Discussion.—Dr. S. D. Risley congratulated Dr. Posey on the ingenious method that he had adopted, and upon his success in removing the foreign body from so critical a position on the anterior capsule. In replying to Dr. Posey's inquiry as to the choice of the powerful magnet, instead of a Sweet or Parker, Dr. Risley said he thought that the choice should depend not only on the location of the foreign body, but also on its size. If the mass were so located that there would be danger of entanglement of the iris or the ciliary body, and if it were relatively large, he thought that it would be prudent to use the lower powered magnets. He had, in one instance, when the foreign body weighed two grains and a half, seen it projected violently from the eye, fastening itself upon the tip of the Haab magnet, ten inches distant, and carrying with it a large amount of the iris, through the wound of entrance, near the corneal limbus. If the smaller magnet should not prove, on trial, to be sufficiently powerful, it would, Dr. Risley said, always be possible to resort to the more powerful instrument.

Dr. Burton Chance said that he thought it quite surprising to note the behavior of the crystalline lens in its reaction to injuries, particularly when there has been retention of a foreign body in the lens substance. In many cases, he said, the reaction has been noted as being but slight; whereas, that which sometimes follows a minute incision, in successful operations, is often disastrous. He, too, has observed the singular spending of the force of flying foreign bodies after they have perforated the cornea or sclera, so that they merely become lodged in the superficial layers of the lens. Dr. Risley's recital of a case of perforation by a sliver from a glazed brick recalled to Dr. Chance's memory a case of his own, which had occurred in his early days, while serving during the absence of a much older confrère. A sliver of japan, struck off from the painted

hinge of a screen door, had penetrated a man's eye. The spicule had perforated the center of the cornea and, without wounding the iris, had become imbedded in the anterior pole of the lens, and was projecting from the surface of the lens well into the anterior chamber. The case was first seen two days after the accident. The reaction had amounted only to a mere annoyance; and, as Dr. Chance was a stranger to him, the patient refused to allow any treatment designed for the extraction of the foreign body. He reported again on the seventh day after the accident, with scarcely any symptoms; the spicule continued imbedded, and, except for a tiny zone about the spicule, the lens was not clouded. The man refused to return for further treatment, and has not been heard of since. Dr. Chance assumes that such wounds of the capsule are clean and smooth, and allow the foreign body to become firmly wedged, thus hindering the access of the aqueous to the lens substance, thereby preventing disintegration, with the consequent chemical and mechanical irritation of the uveal tissues.

O'Connor Operation.

Dr. Posey exhibited two children upon whom he had performed the O'Connor advancement operation the week before. One child, aged eight years, had had a convergent squint in the left eye of fifty degrees. The advancement was aided by tenotomy of the internus of the same eye. Only twenty degrees of improvement were noted. Dr. Posey said that it was but fair to the operation to state that he had departed somewhat from the original procedure, inasmuch as he had included the entire muscle between the catgut loops, instead of the two strands of muscle, as advocated by the author. The muscle strands had buckled up satisfactorily, however, and the immediate effect of the operation had been good. So far as he could judge from the six cases that he had operated upon, Dr. Posey thought that the traumatism produced by the operation was greater, and the advancing effect less, than could be obtained from the single stitch advancement operation which he usually practices.

Retrobulbar Neuritis.

Dr. Posey showed a middle aged man with retrobulbar optic neuritis from diabetes. Alcohol and tobacco had been used

sparingly by the patient. Rapid improvement followed anti-diabetic treatment, abstinence from alcohol and tobacco, the use of sweat baths, and the administration of strychnin.

A Case of Neuroparalytic Keratitis.

Dr. William Zentmayer stated that the patient, A. B., a tailor, was forty-eight years of age. His left eye had become inflamed about October 20, 1914. At first there was a small red spot on the inner surface of the lower lid of the left eye, accompanied with a sensation as of a foreign body. Redness and lacrimation had persisted. The patient had been under constant treatment before coming to Wills Hospital on January 10, 1915. The upper central two-thirds of the cornea was without epithelium. There was moderate ciliary injection, and the cornea and conjunctiva were anesthetic. He was treated as an ambulatory case, while awaiting a vacancy in the ward. A protective bandage was worn constantly, and holocain and atropin were used several times daily. On January 19th the cornea became infected and hypopyon formed. He was then admitted to the hospital. Smears were negative; cultures showed streptococci. The entire cornea was destroyed in forty-eight hours. A neurologic examination, made by Dr. Weisenburg, showed nothing more than a small area of anesthesia over the distribution of the superior orbital nerve on the left side. The patient had had, for at least thirty years, a general tremor of the head and arms. A radiograph of the skull showed no intraorbital or intracranial lesion. The sinuses were examined by Dr. Skillern and found normal. The Wassermann was negative, notwithstanding the fact that there was a history of chancroid about fifteen years previously. There had been no secondaries. The eye was enucleated.

Complete Ophthalmoplegia Externa.

Dr. Risley presented for study and discussion a case that, on cursory examination, presented the usual features of a complete ophthalmoplegia externa. There was moderate exophthalmos. No considerable deviation of the balls was noted; but both were fixed, or nearly so, except for the ability to move them slightly downward. That the nearly stationary position of the eyes was not due to faulty innervation, but to some impediment in the orbit, seemed probable from the fact

that, in the first place, the irides reacted to light; and it was obvious that the patient was able to make unsuccessful efforts to move the eyes. When the eyelids were everted, a lipomatous mass projected at the retrotarsal fold, and was markedly increased in size by pressing the eyeballs backward. The condition of the eyes was, so far as could be learned, apparently congenital. Dr. Risley had not had the opportunity to make an exhaustive study, as the case had only an hour before been assigned to his service. That the lipomatous mass in the orbit, he remarked, was not a pathologic growth, but an anomaly, is suggested by the following facts: that the condition was probably congenital; that the girl, now aged seventeen, had been operated upon for harelip, and that there had apparently been a cleft in the cheek on both sides, which had also been closed by operation. These anomalies of development led to the inquiry as to the probability of faulty development in the anterior segment of the skull—possibly in the orbital walls. There was no colobomata in the iris, choroid, or optic nerve, in either eye, the fundus in each being quite normal in appearance. Dr. Risley suggested that X-ray study might furnish additional evidence, and hoped to present the results of such study at a subsequent meeting of the society.

An Ethmoid Mucocoele Involving the Orbit Treated With the Violet Ray.

Dr. S. M. D. Marshall presented the following case: On April 2, 1914, William S., a negro, aged thirty-eight years, a farmer by occupation, married, with no children, and giving a negative venereal history, presented himself for treatment. He complained of protrusion of the left eye, neuralgic pain on the left side of the head, especially in the region of the left eye, and double vision. He had first noticed the trouble about six months before, and it had grown steadily worse. Examination showed a marked proptosis of the left eye, and partial paralysis of the upper lid, as the result of which there was considerable conjunctival injection and chemosis. The action of all the external muscles was almost entirely gone, especially the superior rectus. Pain and tactile sense were very much diminished over the entire left side of the head and face, especially in the region of the left orbit. The cornea was clear, the iris apparently normal, the lens and vitreous clear, and the

fundus apparently normal, except for slight pallor of the temporal half of the disc. The vision was 6/6 in the right eye; in the left, 6/9 pt. Diplopia was evident on moving an object (twenty inches from the eyes) three inches in any direction. The field of vision in the right eye was apparently normal for form, but that of the left showed a rather marked contraction on the nasal side. The blind spot was apparently normal, and no scotoma was found.

Examination of the nose showed that the upper portion of the nasal cavity on the left side was entirely occluded by a swollen middle turbinate. The patient gave a history of having had a nasopharyngeal catarrh for several years. A tentative diagnosis of ethmoidal mucocoele involving the orbit was made. The nose was treated locally with cocain, adrenalin and albolon spray. Internally, sixty grains of aspirin were given him daily, to control the neuralgic pains. He was instructed to use hot fomentations three times a day, together with a boric acid wash.

Vision remained the same on April 6th; other symptoms were unchanged, except the neuralgia, which apparently had lessened materially. On April 11th it was noted that for the last few days there had been a slight mucopurulent discharge from the nose. The eye condition and the anesthesia remained the same. On April 22d it was suggested that the violet ray generated by our X-ray machine be tried through vacuum tubes in the nose, and directly over the eye. Three treatments were given, all other medication being stopped. The vision became normal in each eye, the proptosis much less marked, and movements of the external muscles greatly increased. The patient felt very much better, but said that he had a dragging pain on moving the eye quickly. The neuralgia had almost disappeared. By June 6th there was only slight proptosis. Consequently, the ocular movements had greatly increased. Sensation in the left side of the head and face had returned, except for a small area of anesthesia on the lower lid, and one on the upper lip. Vision in the right eye was 6/5 pt.; in the left, the same. The field of vision was apparently normal, but the temporal half of the disc remained pale.

Two months later, examination showed absolutely none of the symptoms of which he had complained on his first visit.

The left eye seemed to be less prominent than the right, which was probably due to the contraction of the scar tissue in the orbit. The patient was discharged cured.

Dr. Marshall called attention to the fact that during the whole time that the patient was under observation, he had never lost a day's work. This, considering the time of year and the man's occupation, is rather remarkable. Dr. Marshall further stated that at the time the electrical treatment was started, all medication except a mild nasal spray of camphor, menthol and albolen, was stopped. He was skeptical as to the outcome at that time, and could see nothing ahead but a radical operation, which would have meant to the patient the loss of at least four to eight weeks, not to mention the possibility of a more serious outcome. The speaker thought that the real trouble was an ethmoidal mucocele involving the orbit; and that, by increasing the drainage through the nose, and so stimulating the circulation in the tissues of the orbit, the mucocele was in part discharged and in part absorbed. He believed that the case had been cured by the violet ray, and recommended that in similar cases this should be used, a fair trial being given it before considering a radical operation.

Discussion.—Dr. Posey said that he had had no experience with X- or other rays in the treatment of the class of cases referred to. From the history, he thought that Dr. Marshall's case was one of orbital cellulitis, due to an acute inflammation of the sinus, rather than to mucocele. There was no evidence that the sinus had been blocked up, he said. Indeed, there was a nasal discharge. He referred to a similar case shown by Dr. Fisher before the society in 1913, and said that in that case the orbital cellulitis and the proptosis, which had been extreme, subsided under ordinary nasal treatment.

Errata.

The discussion at the meeting of the Wills Hospital Ophthalmic Society held May 4, 1914, on "Cilia in the Anterior Chamber," should have been credited to Dr. Burton Chance, and not to Dr. Ziegler, as reported.

J. MILTON GRISCOM,
Secretary.

BOOK REVIEW.

Squint: Its Causes, Pathology and Treatment.

By CLAUD WORTH, F. R. C. S., Surgeon to the Royal London Ophthalmic Hospital (Moorfields); Consulting Ophthalmic Surgeon to the West Ham and East London Hospital. Published by P. Blakiston's Son & Co., Philadelphia, 1915.

This is the fourth edition of this work, and comprises 247 pages, with forty-three illustrations and several tables. The name of Worth is so intimately connected with the subject of squint, that even those who do not agree with his conclusions must respect anything which comes from his pen. He defends his theory that squint is the result of a defect in the fusion faculty made manifest by certain provocations, to which other writers have assigned the primary rôle, for example anomalies of refraction. Many interesting case records and tables are given. He gives five methods of treatment for the correction of constant unilateral squint: (1) Optical correction of any refractive error; (2) occlusion of the fixing eye; (3) instillation of atropin into the fixing eye alone; (4) training the fusion sense; (5) operation. He has prescribed glasses for infants as young as six months. The favorable time for training the fusion sense is between the ages of three and five years. He greatly prefers the single advancement operation, which is given in detail.

C. L.

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CARCINOMA, APPARENTLY PRIMARY, ARISING
FROM THE CILIARY PROCESSES.*

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In commenting on the diagnosis of ciliary tumors, Mules¹ states that it is very difficult in the early stage of the growth, unless there be an associated iridodialysis; for these growths produce little or no pain or uneasy sensations until they have attained a considerable size, and from their situation they cannot be seen with an ophthalmoscope, nor do they in any way interfere with vision until they cause pressure on or distort the lens, or, as in some instances, cause an absorption of one or more lens segments. He mentions an instance where the growth of the tumor had induced absorption of the center of the lens, leaving it kidney shaped.

The early or late appearance of the neoplasm in the anterior chamber through an iridodialysis is no measure of its size, but rather determines the seat of the disease; for if the tumor originates in the anterior fibers of the ciliary muscle, or if the base of the iris becomes rapidly implicated, then separation of the iris from its scleral attachments will occur primarily,

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or at least very early, and the tumor, or a portion thereof, present through the iridodialysis; while, on the contrary, if the growth commences in the posterior ciliary fibers, or in an extension from the adjacent choroid, it may attain a considerable size before producing an iridodialysis.

Recurrent hemorrhage into the anterior chamber is a frequent accompaniment and masks the diagnosis, even if there be an iridodialysis.

Knapp¹ pointed out in a discussion in Paris, that the retinal anatomic relations may be maintained while the tumor develops its full size.

Transillumination, a scleral puncture, the presence or absence of a localized bulging or inflammation of either the sclera or the iris, may assist in the diagnosis.

Since there has been much difference of opinion expressed by eye pathologists relative to the proper classification of certain ocular neoplasms, we will consider briefly at this time the literature at our command bearing particularly on primary carcinoma of the ciliary body.

Suker and Grosvenor² in 1909 go so far as to say that "A primary carcinoma of the endocular tunics has never been seen, for the reason that within the globe there are no histologic cells in which a carcinoma per se could originate." Suker³ again in 1912 says that in the examination of a large number of cases and histories he has found that carcinomas are never primary in the eye.

Uthloff⁴ in 1904 describes a microscopically typical case of carcinoma of the ciliary body that died some two months after the eye was enucleated, but disclaims its being primary, although no neoplasm was demonstrated elsewhere in the body during life and no autopsy was performed. He says there were symptoms that indicated a carcinoma of the intestinal tract—loss of appetite, vomiting at times, pain in the epigastrium, tenderness on pressure, etc.

He says there is no such thing as a primary carcinoma of the ciliary body, negating the cases of Lagrange and Collins, hereafter mentioned.

J. Herbert Parsons,⁵ after reviewing the case reported by Treacher Collins and also that of Lagrange, states that the published cases are too few and too anomalous to permit of dogmatic statements.

Fisher and Box⁶ excised an eye in 1885 for a pigmented tumor of the orbit which was diagnosed at the time as melanotic sarcoma. In 1899, or fourteen years later, this patient was operated on for tumor of the liver and died. There was no orbital recurrence. Treacher Collins made a pathologic report of the eye growth, and concluded it was a primary carcinoma of the ciliary body, and much interest was manifested because it was the first of the sort in which the patient has been definitely known to have recurrence in other organs.

As there was some dispute as to the nature of the eye tumor, it was referred to a committee for examination, and this committee confirmed the original diagnosis of sarcoma of the eye. They reported, however, that the tumor of the liver was carcinoma. Collins argued that the growth of the liver must have been secondary to that of the eye, otherwise we should have a case of primary pigmented carcinoma originating in the liver, which would be a most extraordinary occurrence.

Badal and Lagrange⁷ in 1892 publish in detail a case of deeply pigmented primary carcinoma of the ciliary body and processes, and evidence especial interest in its site, its origin and its development; on account of its site, because similar lesions of the ciliary body have never before been demonstrated; on account of its origin, because the cylindric epithelium of the ciliary processes played the predominant part in its genesis; on account of its development, because it was possible to follow step by step the evolution of a neoplasm and to show, as was long before done for glandular carcinomata, those of the breast for example, that the essential elements of the neoplasm were derived from the normal primary epithelium of the region.

Lagrange in commenting on this case suggests the possibility of the growth being secondary to a carcinoma elsewhere in the body. Treacher Collins thinks this very unlikely, because primary melanotic carcinoma is practically unknown in other parts of the body, and it would be a very extraordinary occurrence for a primary nonpigmented growth to give rise to a secondary deeply pigmented one.

Treacher Collins⁸ in 1891 describes experiments by numerous authors which seem to prove that the aqueous and the nutrient fluid of the vitreous are secreted in the ciliary region. By the examination and comparison of a large number of

bleached and unbleached sections of the ciliary region cut on the flat, he made out numerous little tubular processes of epithelial cells. Their tubular character shows up much better when they become enlarged in pathologic conditions. These processes have never before been described, he thinks, because they have been hidden by their pigment and become evident only in bleached sections. He describes in detail his method of bleaching. He feels confident that these are glands concerned in the elaboration of the aqueous humor and nutrient fluid of the vitreous. These glands are, like secreting glands elsewhere, subject to attacks of catarrhal inflammation, which gives rise to the group of symptoms generally included under the term serous iritis. As the result of chronic inflammation there may be considerable overgrowth of their tissue, which overgrowth preserves a glandular type; and they may be the seat of tumors, either adenoma or glandular carcinoma.

He has examined several ciliary body tumors preserved in the Moorfields Hospital laboratory, and has found two the cells of which are of an epithelial type. One from a girl of nineteen years, described as a melanotic sarcoma, was very densely pigmented. So little of it was preserved that, beyond determining its cells to be of an epithelial character, he could make out little as to its nature. The other was from a woman aged sixty-three years, who twenty-five years previously had had a severe blow on the eye from a fist and two years later had found the eye was blind. It gave her no trouble till nine weeks previous to enucleation, when pain and inflammation set in. The growth, which was partially pigmented, sprang from the ciliary processes, and invaded the ciliary muscle and root of the iris. It was originally described as a sarcoma which had undergone mucoid degeneration. It was subsequently reexamined and shown by Mr. Solly at a meeting of the Pathological Society as "a melanotic growth from the eye which appeared to be epithelial." Collins then cut more sections from the tumor and bleached them and found there could be no doubt of the epithelial nature of the cells. In some parts of the tumor they had undergone colloid degeneration, while in others, especially towards the base, which was the most pigmented part, they were grouped in parallel columns cut in various directions. The patient was seen twenty-three months after enucleation; there had been no return of the

growth and she was quite well. He regards this as a melanotic glandular carcinoma, and thinks it highly probable that some other melanotic tumors growing in this region which have been described as sarcomata may have been of a similar nature.

Weeks⁹ in 1912 in a discussion says: "In regard to sarcoma of the ciliary body, I would like to call the attention of the gentlemen to the fact that some of these cases have been described as tubular sarcoma, and the cases of tubular sarcoma are really, so far as I have been able to ascertain, carcinoma of the ciliary body springing from the epithelial layer of that body."

Swanzy's¹⁰ Handbook states that "Primary carcinoma of the ciliary body is an extremely rare disease. Its occurrence in this situation is easily explained if the ciliary body, which secretes the intraocular fluid, has a glandular structure; and, from the researches of Collins, there seems to be every reason to believe that it does contain tubular glands."

Lagrange,¹¹ describing in detail a case published by Carl Emanuel as "Glioma of the pars ciliaris retinae," holds that Emanuel's description and illustrations show that this tumor was completely analogous to glandular carcinoma, and objects to the term glioma as applied to such tumors. Such cases, says Lagrange, have a great scientific importance, for they show that in pathology the epithelium of the pars ciliaris retinae behaves like the epithelium of ordinary glands.

Alt¹² describes several cases which he calls adenoma of the ciliary body, but states that the pathologic descriptions are not complete enough to show definitely the exact nature of the tumors. He concludes, however, that there can be no doubt that new formations of an epithelial character can and do occur primarily in the pigmented and unpigmented epithelial layers on the inner surface of the ciliary body.

Abelsdorff¹³ says that even that part of the uveal tract that is possessed of epithelium, the ciliary body, has a high degree of immunity from both primary and secondary carcinoma. He does not know of any cases of primary in the German literature, and only those of Treacher Collins and Lagrange in the English and French.

Schlipp¹⁴ describes in detail a primary epithelial tumor of the ciliary body which shows the classic features of carcinoma, yet he refrains from so designating it, since there had been no

recurrence in eleven years after the eye became blind and in nine years after its enucleation.

Snell¹⁵ reports a case of typical primary carcinoma of the eyeball of a laborer aged sixty-nine years. This eye had been struck by a piece of cinder fourteen years previously and had been blind since the trauma. So many parts of the eye were involved that its exact origin could not be determined. There were a number of tubular downgrowths from the ciliary body.

Buchanan,¹⁶ who has made extensive study of these tubular glandlike processes, estimates their number as being ten thousand in an eye, and that therefore the ciliary body should be the commonest seat of intraocular carcinoma.

Kütthe and Ginsberg¹⁷ report a case which they designate only as a malignant epithelioma of the ciliary body, saying there are only two similar cases, that of Lagrange, called a carcinoma, and that of Emanuel called a glioma, and saying there is some objection to each title. In their case, glaucoma of the anterior chamber of the eye called attention to a grayish red, nonvascular tumor which covered the outer quadrant of the iris. On section it was found that the ciliary body and the temporal quadrant of the iris were involved in a grayish white, purely epithelial tumor. In the ciliary body itself the tumor grew in every respect like an ordinary carcinoma.

Fuchs¹⁸ in 1908 reports a pigmented annular tumor of the ciliary epithelial cells, discusses in detail a series of cases of tumor of the ciliary epithelium which have come under his notice, and also reviews the cases hitherto published by others, of many of which he has been able to obtain sections for personal investigation. And he clearly establishes their malignant nature by their mode of growth. He concludes that metastasis may be absent because most eyes affected were enucleated before the sclera was perforated, and, too, it may be that these growths have little tendency to metastasis.

On August 18, 1914, Mr. E., aged seventy-one years, a house painter by trade and a veteran of the civil war, became my patient, describing a dark object before the right eye, which he had noticed coming on for a month or more. There was no pain or inflammation, the media were clear and the pupils were equal. Vision in right eye equaled light perception in temporal field. Vision in left eye equaled 20/60 with proper correcting glass.

The temporal three-fifths of right sclera would not transilluminate. Tension normal. Patient gave a history of a fall six years previously, striking on the right brow and being rendered unconscious. The ophthalmoscope showed an intraocular projection toward the center of the vitreous, its base occupying the space between axis 105° and axis 150° . Its color was not unlike that of a normal eyeground, and there were no folds or convolutions of the retina, which appeared stretched more or less tightly over a firm object.

In fact, this feature was so impressive that a tentative diagnosis of the presence of a neoplasm back of the displaced retina was instantly made.

A doubtful prognosis was made and patient directed to report for further examinations frequently. Thirteen days later the eye had become slightly sensitive, and there was some injection of the temporal ciliary region. Enucleation was advised and rejected. In another four weeks the lens had become definitely cataractous, the iris was distended forward and there were degenerative changes of the iris at its periphery, appearing much like globules of fat or perhaps more like a cluster of pearls. The eye gradually became more inflamed and painful during the following two weeks, at the end of which time, October 19, 1914, it was enucleated. The patient convalesced rapidly and felt particularly well. There has been no post-operative orbital involvement. On December 22, 1914, or two months after the enucleation, a careful examination was made by a very competent physician, with the idea of unearthing any malignancy elsewhere in the body. His findings were negative. On March 25, 1915, a small olive-shaped tumor was discovered beneath the abdominal skin near the end of the tenth rib, and since that time many others have shown on the body trunk, and one perhaps the size of a hen's egg on the neck in the carotid region. The early demise of the patient is expected, and an autopsy will probably be had.

The following microscopic report was made of the eye by Dr. George S. Dixon, pathologist to the New York Eye and Ear Infirmary, and his findings were concurred in by Dr. John E. Weeks, who also examined the growth:

"It contained a tumor extending from the ciliary region backward a distance of thirteen millimeters, where it ended abruptly. It encroached on the vitreous toward the median

line a distance of ten millimeters. The anterior portion was in contact with the lens, the posterior free. Am unable to state the size of the base, as it could not be measured and at the same time give you a macroscopic specimen.

"As the mount shows, the color is peculiar—gray near the sclera, shading off into brown, and almost black toward the median line of the globe.

"The cell is the epithelium of the ciliary processes, from which the tumor seems to arise, and they infiltrate the pars at the base to the ora, but do not follow the choroid, which is atrophic. The arrangement of the stroma is alveolar, and it carries the blood vessels which all have good walls. The growth is particularly vascular toward its inner surface or border, and a considerable portion of this part of the growth has undergone cell necrosis. There is a little pigment in this part of the tumor. The iris has the appearance of simple atrophy.

"Diagnosis: Carcinoma arising from the ciliary processes."

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XXVI.

PERIPHERAL ANNULAR INFILTRATE OF THE CORNEA FOLLOWING A SCLERAL PERFORATION.*

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Peripheral annular infiltrate of the cornea is a rare affection, met with ordinarily after small perforating injuries, but also known to occur following intraocular operations, spontaneous rupture of corneal ulcers and metastatic panophthalmitis. During my connection with the laboratory at the Illinois Charitable Eye and Ear Infirmary, a period of ten years, seven hundred and fifty-two eyes have been studied microscopically. Of this number about three-fourths of the cases had etiologic factors capable of producing this condition, tabulated as follows:

Three hundred and twenty-seven following perforating injuries, forty-five after intraocular operations, ninety-one following perforating ulcers, and two because of metastatic panophthalmitis. The fact that this is the only case which shows this condition in four hundred and sixty-five eyes will give some idea as to its rarity. I might also add that during the preceding twelve years, from the establishment of the laboratory in 1893 to the beginning of my connection with it, no case was reported. I am indebted to Dr. Harry W. Woodruff for transferring this case to me.

History.—On August 10, 1913, a boy, eleven years old, was struck in the left eye with a nail which had been shot from a "spring gun." Twenty-four hours later he came to the infirmary with hyperemia and edema of the skin of the lids,

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purulent discharge from the conjunctival sac, marked chemosis and intense injection of the conjunctival and ciliary vessels. About five millimeters from the corneoscleral junction, on the nasal side in the horizontal meridian, a two millimeter wide, round hole is found in the sclera. A millimeter broad, gray ring, with its more sharply defined peripheral border one to two millimeters from the limbus and situated apparently

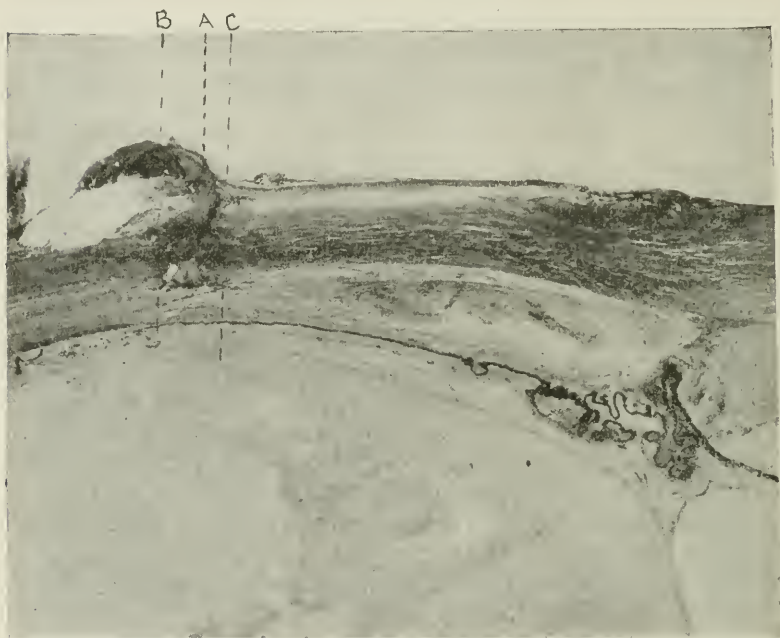


FIGURE 1.

Horizontal section through site of perforation. Magnified 30x1. (A) Scleral perforation with knuckle of ciliary nerve plugging wound; (B) ora serrata; (C) pus.

throughout all layers, circles the cornea, which otherwise is uniformly cloudy. A one to two millimeter high yellowish exudate lies in the bottom of the anterior chamber, which seemingly is deep (hypopyon). The iris markings are very much blurred, the pupil is four to five millimeters wide, and filled in with a gray exudate (evidently atropin had been used).

There is a complete absence of red reflex and the tension is minus one.

The bulb was enucleated, sectioned equatorially and the following gross changes were noted: The cut surfaces of both segments are identical; the vitreous cavity is filled with a



FIGURE II.

Horizontal section through peripheral annular infiltrate. Magnified 30x1. (D) Corneal infiltrate; (E) initial necrosis of deep stroma; (F) pus. (Note widespread hemorrhage in iris and necrosis of stroma.)

semisolid grayish exudate; the retina cannot be definitely recognized, and a one-half millimeter broad brownish ring covers the inner surface of the sclera (exudative choroiditis). Gross

anatomic diagnosis: (a) Unhealed perforating scleral wound; (b) peripheral annular infiltrate of the cornea; (c) panophthalmitis.

The bulb was fixed in Zenker's, imbedded in celloidin and sectioned in the horizontal meridian. One hundred and fifty serial sections were made, forty-four of which were stained with Delafield's hematoxylin and eosin, and six for microorganisms.

Microscopic Findings.—The bundles of the sclera throughout its entire thickness are divided at right angles to the surface, about six millimeters behind the corneoscleral border on the nasal side in the horizontal meridian. The composite picture obtained from specimens one to five, inclusive, demonstrates that all three coats of the eyeball were perforated at this location (punctured perforating wound of the eyeball). Immediately behind the perforation, on the external surface, muscle fibers are present (internal rectus); immediately anterior, on the internal surface, unpigmented ciliary epithelium is found. In the normal eye the tendon of the internal rectus is inserted into the sclera 5.5 millimeters behind the corneoscleral junction, while the ciliary body on the nasal side is 4.6 to 5.2 millimeters broad. After giving these measurements, Salzmann pictures the ora on the nasal side as directly opposite the posterior border of the body of the attachment of the tendon of the internal rectus, consequently this perforation occurred at least six millimeters behind the corneoscleral junction. (My reason for emphasizing this point is to show that the corneal changes to be described can occur when the wound is situated far distant from that structure.)

The severed ends of the scleral bundles are somewhat swollen, but there is a noticeable absence of cellular infiltrate immediately surrounding the perforation. The hole in the sclera gapes about one-half millimeter, and is filled in externally with delicate filaments of fibrin and a granular eosin-staining exudate (fibrinous and albuminous transudate No. 1 and No. 2). Many polynuclear leucocytes are present in the middle portion of the scleral perforation, and a knuckle of a large severed nerve plugs up the internal aperture of the wound (ciliary nerve, No. 2 and No. 4). In specimen No. 4 a few pus cells are found in the gap between the broken ends of the uveal portion of the orbiculus, and in the same specimen the perforation of the elastic lamella and pars ciliaris is observed,

with the divided ends of the pigment epithelium of the ciliary body curved outward into the inner lips of the wound. The ciliary epithelium ends at the site of the wound (No. 2), with only a few degenerated unpigmented cells between the internal opening of the perforation and the adjacent vitreous, which is densely infiltrated with polynuclear leucocytes (No. 6).

Beginning at the corneoscleral junction the epithelium gradually thins down on both sides for a distance of about two millimeters, beyond which the entire epithelial covering has been cast off (total exfoliation of epithelium). One and a half to two millimeters from the corneal margin, on both sides, the lamellæ throughout the entire thickness, especially on the nasal side, are spaced by widened lacunæ closely packed with polynuclear leucocytes. Many of these spaces are very pronounced, some of them being distended to many times the normal width—even to fifteen microns; in consequence of which the cornea is perceptibly thickened, the surface is projecting, and Bowman's membrane over the narrow swollen area is thinned to one-half normal thickness (No. 11). The infiltration is most dense between the lamellæ of the superficial one-third, where the regular lamellar arrangement is lacking, and where the lacunæ of adjacent levels are almost confluent (beginning superficial necrosis). The infiltration shades off quite abruptly on the peripheral side, reaching, however, the limbus, but on the inner edge it disappears gradually, becoming wedge shaped, with the apex reaching almost the center of the cornea in the middle layers; in other words, the wandering cells have emigrated farthest between the middle layers. Only a very few fixed corneal corpuscles can be found that have taken the stain in the posterior half of the stroma behind the central one-third area (evidence of initial necrosis of the deep central layers). Not a vestige of endothelium remains on the posterior surface of Descemet's membrane, which is everywhere intact.

The meshwork of the iris angle is very open, and the widened spaces, especially those belonging to the ligamentum pectinatum and the innermost portion of the trabeculum sclerocorneale, contain a moderate number of wandering cells, red blood corpuscles and fibrin (No. 11 both angles). Schlemm's canal and the anterior ciliary veins are free, with the exception of a slight excess of polynuclear leucocytes.

The anterior chamber is completely filled with a fine granu-

lar coagulum enmeshed at the angles with a delicate eosin-staining fibrinous network. Pus cells are found in abundance in the region of the filtration angles, and especially is this true on the side opposite the injury. Many of these cells are pigment bearing; however, free pigment granules are plentiful (pus and fibrinous coagulum). The pupillary area is filled in with pus, fibrin and disorganized pigment epithelium of the

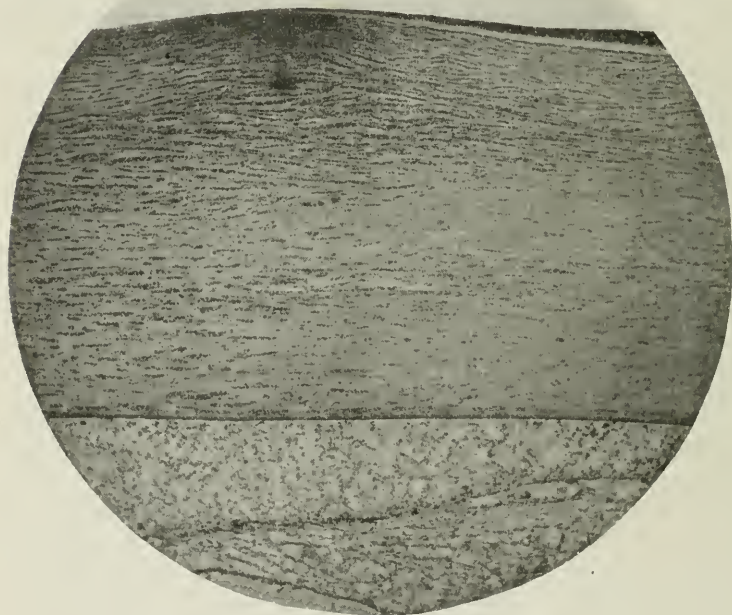


FIGURE III.

Same as (D), Figure 2. Magnified 60x1. Thickened cornea with widened lacunæ packed with pus cells; exfoliation of epithelium; thinned Bowman's membrane; complete absence of endothelium.

iris and ciliary body. The posterior chamber is narrowed by the retraction of the root of the iris, which is matted to the anterior surface of the processes of the corona, and filled with pus, fibrin, albuminous exudate, and numerous detached pigmented epithelial cells (No. 11 temporal).

The iris stroma is thickened, moderately permeated with pus cells with intra- and extracellular pigment granules, and innumerable pigmented cells resembling the pigment epithelium of the iris (No. 11 temporal). The nuclei of the stroma cells stain so poorly that it is difficult to determine the exact boundary of the iris surface and the anterior chamber (No. 6). Extensive vessel wall alteration is evidenced by widespread hemorrhages in the region of the *circulus iridis minor* (puru-

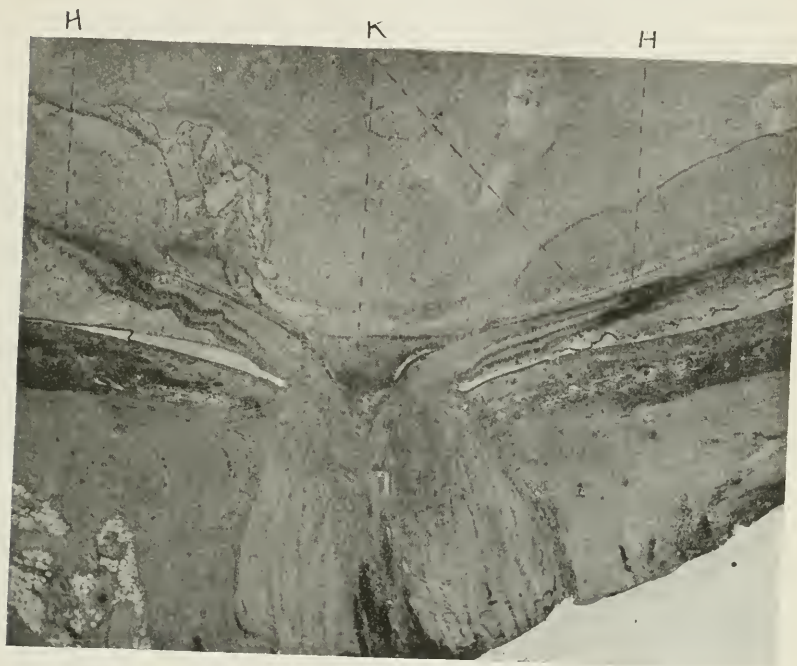


FIGURE IV.

(H) Ends of necrotic retina; (K) pus.

lent iritis and necrosis). On the temporal side of specimen No. 11 the pigment epithelium is completely denuded except at the root, where the posterior surface adheres to the processes. The retracted iris on the nasal side hugs the anterior capsule of the lens well toward the equator, and is separated from it by a layer of pus, pigment and red corpuscles eight to twelve cells deep.

The processes of the ciliary body are intensely congested, matted, and densely infiltrated with polynuclear leucocytes; the apices are broken down, and pouring out an enormous amount of cellular exudate into the posterior chamber, into the cavity of the canal of Petit and into the vitreous (No. 1, No. 6 and No. 11). The outermost fibers of the zonule destined to the capsule anterior to the equator have ruptured. The unpigmented ciliary epithelium has largely disappeared almost as far back as the ora and is replaced by delicate fibrin and pus cells. Both layers of epithelium of the orbiculus are pushed away from the elastic lamella by a cellular exudate of variable width which has replaced the interlamellar connective tissue, and the elastic lamella is also separated from the vascular layer by a broad belt of polynuclear leucocytes, sparse mononuclear lymphocytes and red blood corpuscles. The elastic lamella is exceptionally easy to trace because of the broad exudate on both sides of it, and in none of the specimens can a direct communication be found between the two layers of cells. (Note the situation of the *circulus iridis major*.)

A detailed description of the choroid tallies so closely with that of the vascular portion of the ciliary body that it will be omitted; it must be said, however, that it is enormously widened, and the elastic lamina remains unbroken.

Only a very narrow collar of poorly stained retina, in which all layers can be identified, remains surrounding the optic nerve (extensive necrosis of retina, No. 17). The anterior and posterior vitreous is permeated with pus cells, and a large aggregation of polynuclear leucocytes are behind the sclera in the region of the optic nerve (panophthalmitis and retrobulbar abscess, No. 17 and No. 18).

A close search for bacteria was made in ten sections, and typical pneumococci were found in the anterior vitreous; particular attention was given to the anterior chamber and the lumina of the vessels, but no microorganisms could be discovered.

Anatomic Diagnosis: (1) Unhealed perforating wound of the sclera; (2) peripheral annular infiltrate of the cornea; (3) endophthalmitis septica; (4) retrobulbar abscess, occurring twenty-four hours after injury.

XXVII.

ALBINISM IN MAN, WITH SPECIAL REFERENCE TO THE EYE.*

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PIGMENT AND PIGMENT CELLS.

Little is known concerning pigment, and still less of what are termed "pigmentiferous cells." The attack upon this problem by chemic and biochemic methods has resulted in theories which, to my mind, are not satisfying. One that is receiving rather general acceptance is that pigment is generated in epiblastic cells and that the mesoblastic pigment has migrated from these cells.

Pathology and embryology have given more assistance. The phenomenon of migration of pigment is now well established. A good example of this is the transference of pigment from the retinal pigmentiferous cells to the inner coats of the retina around the blood vessels, in retinitis pigmentosa.

It is well known that the two kinds of pigment cells found in the eye differ in their embryonic origin; those known as the stroma pigment or chromatophores are in the mesoblastic layer, while the retinal pigmentiferous cells are derived from the epiblastic.

These two classes of cells differ not only in their shape but in their content. The chromatophores are large, branched cells; amorphous masses of pigment are therein contained. The retinal pigment cells are hexagonal, and the pigment takes the form of rods or crystallike formation and pigment granules.

Kölliker and other observers have found that epiblastic pigment is deposited very early in embryonic life, its rudiments being visible by the end of the fourth week in man; being

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abundant at the eighth and perhaps fully formed at the twelfth week, while the mesoblastic pigment in the ciliary body and iris is scarcely represented even at birth, but develops at a varying rate and in differing degrees in the first months or years of life.

The recognition that the pigment epithelium has a common origin with the rest of the retina is of fundamental importance in the study of albinism of the eye.

The amount of mesoblastic pigment in the normal eye of different races and different individuals varies greatly, as shown by the color, brown as compared with gray and blue, while the study by pathologists of the amount of the retinal pigment in the normal eye of different races and individuals has been limited.

Professor Fuchs agrees with Mr. George Coats in his statement that the amount of epithelial pigment is constant in normal European eyes, and that in man in eyes with colorless iris and choroid (as the East Frisians and other extreme blond families) the pigment epithelium shows, in an average of sections, no sensible difference in amount or color from that in dark eyes.

DEFINITION.

In view of the more recent studies in albinism, the accepted definition, "a want or absence of pigment in the hair, skin and eyes, accompanied by defective vision, ametropia, and photophobia," needs revision.

What this revision should be is, I think, well expressed in Karl Pearson's definition: "A complete albino is one whose skin is of characteristic pallor, or milky whiteness, whose hair is 'white,' tinged possibly with yellow or straw, and whose eyes have pink or red pupils, translucent irides, with the usual accompaniment of defective vision and nystagmus." I would add to this the other eye symptom, photophobia.

The leaving out of "want or absence of pigment" is based upon the microscopic eye findings in man and animals by Manz¹, Usher, Coats and Nettleship.

MICROSCOPIC EXAMINATION OF THE EYE OF ALBINOTICS.

In all six cases of albinotic eyes in man have come to section.

(1) Manz—The first of these cases is due to Manz. He states that the eye condition and hair color were such that the

woman whose eyes were examined must be classed as an albino. She had, further, red pupils and suffered photophobia. There is small doubt that in any such an investigation as the present she would have been classed as a complete albino, although a certain degree of pigmentation of the pigment epithelium was present.

The tissue of the iris, choroid and ciliary body was absolutely devoid of pigment, and even the brown pigment of the epithelium was so scanty as to permit the nuclei to be seen, while in some parts uncolored protoplasm could be seen between the granules of the pigment.

(2) Nettleship—In a second case Nettleship examined sections of the sector of iris made during removal of cataract from an old gentleman who was universally recognized as completely albinotic. "In this specimen, not only the iris itself, but its posterior epithelium, so far as it is present, is absolutely devoid of any trace of pigment, and the nuclei of the cells are in consequence seen with the same ease as in any other colorless tissues." Here the albinism appears to have been complete, although we have the evidence available from a small piece of iris: his hair was, and is said always to have been, white as silver.

(3 and 4) Usher—Two cases are due to Usher, who obtained specimens from two albino old men; and the results are also described by Nettleship. We read: "One of these died of heart failure a few weeks after a successful operation for cataract in 1905.

His hair, eyebrows and eyelashes were white, as they had always been, and when light was thrown on the sclerotic, a marked red reflex was returned through the pupil and through large areas of the iris; in fact, he seemed to be a complete albinotic. Yet on microscopic examination of sections of the iris and choroid, Usher found a good deal of brown pigment in both layers of the epithelium on the back of the iris, though not enough to prevent the nuclei being well seen; also in that of the ciliary body, and some, but decidedly less, in the retinal pigment epithelium of the fundus.

No trace of pigment could be found in the proper structure of the iris, ciliary body and most anterior part of the choroid near the ora serrata; but there was a very scanty though quite evident pigmentation of some of the choroidal cells, especially

of those of the suprachoroidea at the posterior part of the globe, and this was somewhat more marked near the yellow spot than elsewhere.

In Usher's second case, described as an albino old man, whose eyes were typically albinotic and hair light, sections of iris showed a similar condition to those of the first case.

(5) Coats—(Dr. T. G. Turner's case.) Report on the eye of an albinotic negro, by George Coats. "The globe was slightly collapsed when received."

PIGMENT EPITHELIUM.

In the iris the epithelium is pigmented throughout. The tint is a medium brown, considerably lighter than the normal blue European eye. Of the derivatives of the epithelium, clump cells are few in number and collected mostly in the neighborhood of the sphincter.

Their pigment is coarser and darker than that of the posterior epithelial cells. Grunert's spur is the only one which is well developed; v. Michel's is indicated.

The dilator is slightly pigmented, the sphincter is unpigmented. Apart from some irregularity of the ciliary processes, which is not uncommon in the normal eye, the epithelial pigmentation of the ciliary body is uniform and fairly deep; it is certainly as deep as in many European eyes; no clump cells are present.

Behind the ora serrata the pigmentation rapidly decreases, and it is very slight in the whole posterior part of the globe. Except in the immediate vicinity of the nerve entrance, however, none of the cells are without slightly colored granules.

The depth of pigmentation in the macula is about the same as elsewhere.

STROMA PIGMENT.

Stroma pigment is completely absent in the ciliary body, choroid, sclerocorneal margin and along the perforating nerves and vessels. The epithelium of the limbus corneæ is also unpigmented. In the ligamentum pectinatum a few pale chromatophores occur. In the iris, chromatophores are abundant.

They show the usual aggregation in the anterior layers of the stroma, and are also more numerous towards the sphincter margin than near the root.

The individual cells seem to be well filled with pigment granules, which, however, are abnormally light in tint.

The case, therefore, is one of incomplete albinism, the retinal pigment being represented in all, the stroma pigment in some, of its normal situations. From a study of the chromatophores of the iris and of the epithelium in the posterior part of the globe, the impression conveyed is that the pigment bearing apparatus, even to the intracellular granules, has been developed, but has not received its full charge of coloring matter.

(6) Elschnig—At the Heidelberg Congress (May, 1913) Elschnig described dissection of a human albinotic eye; there was some pigment present in the epithelium of the iris and ciliary body, and in some clump cells; there was no fovea.

CONCLUSIONS FROM MICROSCOPIC FINDINGS.

From the few cases that have so far been reported, one is not warranted in reaching conclusions from the microscopic findings of the albinotic eye in man; but the very extensive study of albinotic eyes in animals,² conducted by these investigators, corroborates them, making the following conclusions altogether probable:

1. The definition as made by Pearson is warranted by the findings, that "clinically" albinotic eyes are not, as a rule, without pigment.

2. The all important conclusion is reached that it is reduction or loss of retinal epithelial pigment, with a change in the structure of these pigmentiferous cells, that characterizes the albinotic eye and causes reduction in sight, with nystagmus as a resulting symptom.

3. Regarding the function of the mesoblastic pigment, it is probably true that it is to make a dark chamber, so that the image on the retina will have the proper contrast.

These findings are confirmatory of what we have long held to be true: that the retinal or epithelial cells have much to do with the function of vision. Since the work of Kühne it has been held that this pigment has to do with the regeneration of the visual purple; however, there may be some question as to this. Shaffer in his "Physiology" speaks of the regeneration of the visual purple in an albinotic rabbit. I am sorry to say he does not mention whether there was any pigment in the cells or not.

ALBINISM OF EYES ALONE.

Cases of albinism of the eyes without involvement of the hair or skin have been reported by Lawford, Nettleship, Stevenson and Gamble.

Gamble's case.³—Master A. (parents second cousins), twenty-seven months old, first came under observation when eight months old. Mother stated that he could not see like other children of that age.

In addition to the lateral nystagmus and red pupil, it could readily be seen that the eyes were albinotic. There was evidently some pigment in the irides, as a suggestion of color was present in both. Fundus oculi, typically albinotic.

There was no evidence of albinism in other parts of the body. The skin was normally pigmented and the hair was light brown. The child has been under observation up to the present time, and, as commonly seen in young children, the hair has grown darker, now dark brown, and it is my opinion that the irides are also darker.

At about sixteen months of age his hypermetropia was corrected, the lens being ground out of London smoked glass No. 3. With the glasses on he plays with other children and with small objects.

As to the prognosis in cases of albino young children, there are observations which indicate that the pigmentation of the eye is increased with age. Such cases have been noted by Ascherson, Myer, Usher and Abadie.

In the Ascherson case, in a child with white hair and violet colored eyes and dark red pupils, at the end of the third year the hair became light brown and the eyes light blue, and vision improved.

Abadie reported a case of two albinotic siblings quite blind at nine months of age, then gradually evidence of sight appeared, and at nine years of age their acuity of vision was $1/100$.

Nettleship and Usher had under observation a case of incomplete albinism in which the visual acuity was $6/60$ at the age of six years. The vision increased to $6/18$ when he was eight years of age, and at eighteen he had $6/12$, nystagmus still being present; they remark that in the young, in cases of partial albinism of the eye, the prospect is favorable for improvement in sight with proper treatment.

Regarding the case reported by the author, this child, now three and one-half years old, uses his eyes, especially with the colored glasses on, with much more comfort than he did when a baby. There is question whether his visual acuity has increased. I am unable to make a statement as to this at the present time.

It would seem from general observation and embryologic findings that the prognosis is better in cases of this kind, where there is some mesoblastic pigment in the eye, than where it is absent, for in these cases there will be, in all probability, a progressive deposit of mesoblastic pigment as the child grows older, as seen in the child with normal eyes. As to whether there is an increase in epiblastic pigment with increase of age, nothing is known.

Irregular deposits of mesoblastic pigment in the iris are occasionally seen, one sector of the iris being a different color from the rest, an accumulation of brown pigment in certain areas of blue irides. These cases of aberrant deposit, so far as we know, would not come under the head of albinism.

Even from the clinical point of view the almost colorless (grayish or bluish white) irides of the East Frisians and other families of "extreme blondism," in connection with very light hair and skin, are not considered as examples of albinism, for the reason that these people have good vision and no nystagmus. These are the important symptoms for differential diagnosis, and the test should be applied in all types of heterochromia.

On the other hand, we see cases of "blue eyes" that are albinotic. Dr. Helen Carncross of Chicago has in her practice an albino mulatto child, which I had the pleasure of seeing, with marked blue irides, red pupils, albinotic fundus oculi, very poor vision and nystagmus. Yet pathologists (Coats, Usher) consider wall-eyed horses or dogs (disturbance of mesoblastic pigment) as cases of partial albinism, the function of the eyes not being considered in making the diagnosis.

FUNDUS OF THE ALBINOTIC EYE.

We are all more or less familiar with the albinotic fundus oculi, which is characterized by lighter orange color than the normal, and by the presence in plain view of the choroidal vessels, as well as the retinal. The optic disc looks darker

and redder, owing to the contrast with light orange colored choroid. Except in myopia, the choroidal vessels are not made out well in the region of the fovea centralis.

Elschnig has recently reported a case in which the fovea was absent.

Duane⁴ reported "an albino twenty-six years old; fundus at periphery entirely destitute of pigment, giving a typical picture of albinotic background; intermediate zone and central areas normally pigmented, forming red patches which in places are separated by a sharp outline from the adjoining white fundus."

In a recent personal correspondence he says that he has observed in the fundus of infants and adults the "presence of albinotic and semialbinotic areas."

Especially in young children we have seen cases in which the correction of refractive errors did not increase the vision, as was to be expected. Many of these cases I have been in the habit of recording as having "thin retina" or "undeveloped retina."

In some cases of amblyopia might it not be possible that the cause is in the pigment epithelium, and that a more careful study of the fundus might make it possible for us to recognize it?

I am prescribing colored glasses more often than formerly, with gratifying results. I must confess that I do so empirically, not knowing whether the patient has an insufficient quantity of ocular pigment or whether the symptom is one of neurosis.

In this connection I quote from Pearson, Nettleship and Usher: "There is a reason for believing that injurious deficiency of pigment may be restricted to the pigmented epithelium of the retina, and possibly to a part only of the retinal area, the iris being blue or gray (never brown, as far as recorded cases show), but not translucent, and the choroid light, but not to such a degree as to suggest albinism. The pupils never red. Hair often very fair in childhood, becoming pigmented later. There is nystagmus, considerable astigmatism and irremediable defect of sight.

"No microscopic examination has been made of such eyes, and the diagnosis of purely retinal albinism has been made by indirect evidence and exclusion; the condition is often found

in several siblings, and appears to be commoner in males than in females, while in some instances typical general albinism has occurred in the same family."

Albinism is undoubtedly of inherited origin. It is often of familial type; consanguinity does not play a major rôle.

Ametropia, especially astigmatism, which is almost universally present in albinotic eyes, is an inherited deformity; just as we commonly charge it up to inheritance in unalbinotic eyes.

There is no doubt that the general opinion is correct, that photophobia is due to reduction in amount of pigment in the eye and not to neurosis, or to structural changes in the ophthalmic branch of the fifth.

Nystagmus is due to reduction in sight in early life, as we see it in eyes that have lost some of the transparency of the cornea from ophthalmia neonatorum

TREATMENT.

Theoretically, lenses should meet the following conditions: (1) To cut off all invisible and enough of the visible rays to prevent dazzling without reduction in vision. (2) To prevent light from entering the eye through the body of the iris and sclera. In practice these conditions are difficult to fulfill. Glass of neutral gray tint filters out the invisible and some of the visible rays, but at the same time reduces the visual acuity. The "smoked glass" is fairly satisfactory. The degree of tint to be given depends on the need of the individual patient. When the acuity of vision is fair with much dazzling, a darker lens can be used than when the vision is very poor. Light coming from the temporal side can be excluded fairly well with least disturbance in ventilation by use of fine mesh oxidized wire screen, made to conform to the contour of the temple, and light from above and below, and the nasal side can be excluded by using toric lenses (when refraction will permit) of a size to suit the particular eye. By using a light flexible half-cable temple the lenses can be held in close contact with the skin surface.

The all-important consideration in the treatment of these cases is to correct the error of refraction at the earliest age at which the patient can wear glasses, usually at about sixteen months.

This is especially true if the patient has squint. The clearer

image that he gets from the lens and from the smoked glasses stimulates him to function with the eye, which is so necessary to its development, for we all know that after the sixth or seventh year the development of the cerebral visual apparatus is at an end, as seen in the amblyopia of the squinting eye.

GENERAL CONSIDERATIONS.

The study of sections of albinotic eyes may at first seem of only academic scientific interest; the results when fully worked out will add to the little that we know of pigment and pigmentiferous cells. Sooner or later this knowledge will aid in the study of kindred pathologic conditions, such as retinitis pigmentosa, retinitis punctata albescens and leucoderma.

It is probable in the subject of heredity that the most important contribution to science will be made through the study of albinism. The accumulation of a large number of pedigrees of albinotic stock is necessary for this study.

Francis Galton put it in this way: "Until the phenomena of any branch of knowledge have been submitted to measurement and number, it cannot assume the status and dignity of a science."

In recent personal communication from Mr. Karl Pearson⁵ and Mr. C. H. Usher, they express a desire for pedigrees and enucleated eyes, for which they will give the donor proper credit in their forthcoming monograph. Many pedigrees have already been sent to them by American physicians, but no enucleated eyes; indeed, a large correspondence with pathologists of ophthalmologic hospitals reveals the fact that there are probably no sections of such eyes in this country. It would seem that the time is ripe for work of this kind to be initiated.

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XXVIII.

THE BLIND SPOT.*

(FIRST COMMUNICATION.)

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I.—HISTORY.

In 1668, Edm. Mariotte⁵³ announced the discovery of the blind spot. From his work upon this physiologic fact,⁵⁴ he concluded that the choroidal coat of the eye was the light perceiving element, contrary to the general belief of the time, which yielded this position to the retina. He was immediately attacked by Pecquet,⁶³ who, together with his followers, Per-rault⁶⁴ and Briggs,⁸ practically neglected the existence of the blind spot. The original discoverer appreciated the fact that the existence of this blind area was due to the entrance of the optic nerve into the eyeball, but failed to attribute any pathologic importance to his discovery.

After the controversy that arose following Mariotte's publications, more than a century and a half passed before any further mention of the blind spot appeared in the literature. Thomas Young, Listing, Mackenzie, von Graefe and the other prominent ophthalmologists of the early half of the nineteenth century, spoke of the existence of the blind spot as an interesting physiologic occurrence: but none realized its significance, with the possible exception of von Graefe.²⁶ In writing of amblyopic affections, principally of unknown origin, he mentioned an enlargement of the blind spot, but entirely misunderstood its import. This was published in 1856. In 1859, Coccia¹³ described an enlargement of the blind spot toward the periphery, confluent with a temporal defect in the visual fields, as diagnostic of glaucoma. But little attention

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was paid to this important communication until Bjerrum⁷ published his method of testing for defects in the visual field and emphasized the defect pathognomonic of glaucoma. Even today this important diagnostic aid is but seldom invoked.

Attention was again turned to the blind spot in 1869, when Leber⁵¹ published a case of toxic amblyopia with central scotoma and enlargement of the blind spot. This aroused a large amount of comment, and for several years the literature was filled with similar cases, both for and against Leber's findings. The discussion was apparently closed by the appearance of Wilbrand and Sanger's book,⁸⁴ wherein they agreed with Leber in every detail.

In 1903, Cantonnet¹¹ reported the results of the examination of the blind spot in thirty-five cases of myopia of varying degrees of severity and, in a later communication,¹² showed that important prognostic points regarding the malignancy of this error of refraction could be drawn from the blind spot findings. Two years after the primary communication, Bjerrum⁷ spoke of the value of this examination.

Maitland Ramsey and Sutherland,⁷⁹ in 1906, described five cases of sympathetic irritation or ophthalmia with enlargement of the blind spot. This was followed two years later by an article by Holth⁴¹ with three further similar cases. Although this symptom has been found repeatedly since then in sympathetic affections, no importance has been attached to it, nor has any even probable explanation for its occurrence been offered.

Enlargement of the blind spot due to medullated nerve fibers was described by Landolt,⁴⁸ who made measurements upon three cases. Kleczkowski⁴⁵ also reported similar cases. This symptom has been found in various conditions according to various authors, principal among whom was Epeleers,¹⁷ who described a blind spot scotoma in eleven out of thirteen cases of eclipse blinding.

The most important discovery of late years relating to the blind spot was made by van der Hoeve,³⁹ who, in 1909, described a case of optic nerve involvement from posterior ethmoiditis, diagnosed by an enlargement of the blind spot. One year later he published⁴⁶ six further cases, and was supported in his contention as to the value of this finding by de Kleijn,⁴⁶ who added important evidence from the rhinologic

standpoint. Today the absolute value of this symptom is still a mooted question, possibly due to difficulty of measuring the blind spot accurately, and to the failure of standardizing the results obtained by the various types of apparatus employed in these measurements.

II.—ANATOMY OF THE BLIND SPOT AND SURROUNDING RETINA.

That the presence of the blind spot is due to an area within the eyeball incapable of light perception was recognized by Mariotte.⁵³ He attributed this to the lack of the choroidal coat at the entrance of the optic nerve, and argued from this that the choroid was the light perceiving element. But his supposition was purely theoretic, and it remained for Donders,¹⁵ in 1852, to actually prove that the blind spot, as projected into the third dimension, corresponded to the entrance of the optic nerve into the eyeball. By using a small plane mirror, he threw a narrow beam of light into his own eye. When this beam fell upon the optic disc, no actual light was perceived, and only a sensation of light resulted from the minute dispersion and diffraction by the lens and vitreous. As soon as the beam of light overstepped the boundaries of the disc, normal light perception occurred. This experimental work was supplemented by the more or less theoretic discussion of Helmholtz.³⁵ The great physicist believed that there was no light perception in the blind area, nor was there a transference of light perception on to the blind spot from the surrounding retina. From the area mapped out by the reflecting source of the beam of light, Donders¹⁵ calculated the size of the entrance of the optic nerve into the eye, and this figure corresponded with the anatomic measurements. Salzmänn⁷⁰ estimates it to vary from three to three and one-half millimeters.

When clinical attention was first directed toward the blind spot, the course of the nerve fibers emanating from the surrounding retina was unknown.

In the discussion of toxic amblyopia, Leber,⁵¹ in 1869, speaks of the nerve fibers from the macula passing backward through the nerve and lying directly under the vaginal sheaths. This opinion was based upon the signs of degeneration in one case. But probably this section was in the vascular portion of the nerve, although no mention is made of the original loca-

tion of the section. Furthermore, from the case history it would appear that an enlargement of the blind spot must have been one of the early clinical features, occurring, in all likelihood, before the patient came for examination. By that time the blind spot scotoma was included in the larger central scotoma. Schwalbe⁷³ agreed with Leber. In a later article (1874) Leber⁵⁰ again voiced his belief in the peripheral location of the fibers from the macula and the retina immediately around the disc. The peripheral retinal fibers must be axial, he argued, otherwise there would be a decussation of fibers at the entrance of the optic nerve into the eyeball, and this had never been found.

In the same year Förster²⁰ hinted at the axial location of the fibers from the macula, the papillomacular bundle. This occurred in his discussion of the amblyopia of tobacco intoxication, when he said that he believed the specific injury to lie in the axial portion of the optic nerve, and not in the brain. Just previous to this statement he had been speaking of the central scotoma due to atrophy of the fibers from the macular region. Four years later¹⁹ he voiced the belief that the macular fibers lay in the center of the optic nerve along the axis, while the peripheral retinal fibers were to be found in the periphery of the nerve. The next year, Binswanger and Wilbrand³ had the opportunity of examining microscopically both optic nerves from a case of toxic amblyopia. They found the macular bundle different in the right and left nerves, but were unable to outline a regular course for the bundle. No mention was made of the course of the fibers from the retina immediately around the disc.

It remained for Samuelsohn,⁷¹ in 1882, to outline the course of the papillomacular bundle and to suggest the course of the fibers from the retina immediately surrounding the disc. He obtained the nerves from a case of toxic amblyopia with normal peripheral visual fields, but large central scotomata involving the blind spot. Except for a degeneration of the papillomacular bundles, the nerves were normal. Careful serial sections of the nerves, stained by the gold chlorid method, enabled him to divide the course of the bundle through the nerve into three parts: the vascular portion, the avascular portion, and the canalicular portion. In the first section, the papillomacular bundle formed a V-shaped sector of the entire nerve,

occupying about one-third of the periphery and coming to a sharp point in the exact center of the nerve. As the avascular portion of the nerve was approached, the bundle gradually receded from the extreme periphery and from the exact center to form an absolutely round bundle, lying half way between the center and the periphery of the nerve and occupying about one-fourth of the entire area. This configuration was maintained almost up to the canalicular portion of the nerve. The bundle then became gradually flattened by an increase in the horizontal and a decrease in the vertical diameter. During the passage of the nerve through the bony canal, the papillomacular bundle was somewhat crescentic in shape. Samuelsohn also spoke of the probability of the fibers from the retina immediately around the disc lying in the extreme periphery of the nerve.

To Fuchs²³ belongs the credit of the localization of the fibers from the retina immediately around the disc, the peripapillar fibers. He announced that the peripheral bundles, lying immediately underneath the pia, supply the retinal areas surrounding the disc. This he believed to be true for the anterior or vascular portion of the nerve, and in all probability for the posterior as well. Thus any interference with the peripheral bundles would result in enlargement of the blind spot. Berger⁴ agreed with this exposition when he stated that blindness resulting from sphenoid disease was due to a compression of the nerve within the optic canal. In his book, Hajek³⁰ also argued indirectly for the peripheral location of the peripapillar bundles with the statement that "The cause of blindness from sinus disease is either compression of the optic nerve within the foramen, or perineuritis." De Laperonne⁴⁹ considers these affairs to be a "neurite-oedémateuse."

In view of the anatomic examinations by Samuelsohn and Fuchs, of the anatomic relationships of the optic nerve as an entity (to be discussed in the next chapter), and of the clinical phases of enlargement of the blind spot, and central scotomata, we may be justified in outlining the intraneural course of the optic nerve bundles as follows:

The papillomacular bundle enters the nerve on the temporal side as a V-shaped sector, coming to a point in the center. It passes backward, assuming a more cylindric form, and at the junction of the vascular and avascular portions of the nerve

no longer lies in the periphery, nor does it reach to the center. As the canalicular portion of the nerve is approached, the bundle flattens and gradually becomes crescentic, lying in apposition within the bony canal with the vena centralis nervi optici posterior (see chapter III).

The peripapillar bundles, composed of fibers from the retina immediately around the disc, lie in the periphery of the optic nerve directly underneath the pia, throughout its entire course.

III.—THE ANATOMIC RELATIONS OF THE OPTIC NERVE.

Before considering the clinical phases of enlargement of the blind spot, it becomes necessary to speak of the anatomic relations of the optic nerve between the chiasm and the eyeball. The vascular portion of the nerve, about fifteen millimeters in length, lies free in the orbit and in contact only with the surrounding orbital fat. The avascular portion of the nerve also lies free in the orbit, but is in rather intimate relationship with the ophthalmic artery and vein, which are to be found below and to the temporal side of the nerve. Thus these portions of the nerve are not apt to be affected by any disease, except purulent inflammation of the orbit which would be of such violence as to eliminate any observations upon the blind spot.

But the canalicular portion of the optic nerve offers a very favorable point of attack. Here we have a small bony tunnel about three and a half to four millimeters in diameter, completely filled with vulnerable tissues. This canal is only eight to ten millimeters long, but lies in intimate association with several dangerous sinuses. According to Onodi,⁵⁸ there are six main types of relation between the posterior accessory sinuses and the optic canal:

1. The two optic canals are formed by sphenoidal cells, on both sides.
2. Both optic canals are in relation only with the most posterior ethmoid cells.
3. One optic canal is bounded by a sphenoid and the other by a posterior ethmoid cell.
4. Either optic canal alone may be in relationship with a posterior ethmoid or a sphenoid cell.
5. The optic canal may come into contact with both sphenoid and posterior ethmoid cells.

6. The optic canal may be in relationship with neither posterior ethmoid nor sphenoid cells.

Loeb⁵² agreed in the main with Onodi, and amplified his work in a very pretty anatomic study. He divided the optic nerve into the free portion and sinus portion, the latter being within three millimeters of the sinus wall. He found the free portion to average twenty millimeters in length, and the sinus portion twenty-four millimeters. The sinus portion of the nerve passes externally along the roof or lateral wall of the sphenoid, and usually comes into slight relation with the last posterior ethmoid cell. From thence on the nerve lies free within the orbit. But, Loeb adds, there is no absolute constancy in the relation of the sphenoid to the optic nerve. Both Onodi and Loeb emphasize the intimacy of the sphenoid and posterior ethmoid cells with the optic nerve as important in explaining affections of the optic nerve due to sinus disease. Personally, I cannot agree with either author, but I believe that the relationship of the soft tissues in and around the optic canal plays the important rôle in this disease.

The periosteum of the orbit is a thin vascular tissue, closely adherent to the bone. In conformation with the shape of the orbit, it is funnel-shaped, with the apex at the optic canal, through which the periosteum continues. Practically three sides of the orbit are formed by bone whose opposite surfaces form the limiting borders of the various sinuses. These bones are comparatively thin and are perforated extensively by diploic veins. Consequently, these veins form a link intimately associating the periosteum of the orbit and the periosteum of the sinuses. Within the optic canal the orbital periosteum becomes associated and blends intimately with the dura covering the nerve. These two tissues are so inseparable throughout the course of the nerve through the optic canal that no microscopic differentiation can be recognized (Gray).²⁷

Our knowledge of the blood supply of the optic nerve and its sheaths is due to Vossius.⁸³ The vascular portion of the nerve and its sheaths are, of course, supplied by the arteria centralis retinæ and the accompanying vein. Immediately after its entrance into the optic nerve, this artery sends a moderate sized branch backward through the center of the avascular portion (so-called). This terminates shortly before the canalicular portion is reached. Accompanying this vessel is a

vein that empties into the vena centralis retinae. The canalicular portion of the nerve derives its nourishment from small arterioles that come from the muscle branches of the ophthalmic artery and lie along the under surface of the nerve. From the posterior orbital portion of the nerve and its sheaths arise small veins that gradually work toward the center of the nerve in the canalicular portion, there uniting to form the vena centralis nervi optici posterior. To Vossius⁸³ belongs the credit of first describing this highly important vein. It lies in the exact center of the nerve in the canalicular portion and receives branches not only from the nerve and its sheaths, but also from the posterior aspects of the orbital periosteum. The posterior vein of Vossius leaves the nerve at the posterior end of the optic canal and pours directly into the cavernous sinus.

These anatomic facts explain the course of disease from the accessory sinuses to the optic nerve. The infection, the edema, or whatever may be the disturbing factor, passes from the sinus periosteum through the diploic veins and lymph channels to the orbital periosteum, thence by continuity to the intracanalicular portion of the dura of the optic nerve, or possibly through the periosteal veins or dural veins directly to the central vein of Vossius. If the dura alone is involved, thus causing a pressure upon the periphery of the optic nerve within the canal, the peripapillar bundles alone will be involved and an enlargement of the blind spot will result. If the process extends further and involves the central vein of Vossius, surrounding it by an edema, the neighboring nerve bundles will suffer. These happen to be the papillomacular bundles and there results a central scotoma. Consequently, I believe that I am justified in stating that the anatomic relations of the sphenoid and ethmoid cells to the optic canal are immaterial when it comes to a question of optic nerve involvement in accessory sinus disease. The trouble is transmitted by the soft tissues alone.

IV.—PATHOLOGIC SIGNIFICANCE OF THE BLIND SPOT.

A.—THE BLIND SPOT IN MYOPIA.

The first to call attention to the blind spot in myopic eyes was Cantonnet.¹¹ He measured, as accurately as possible, the size of the blind area in thirty-five cases of myopia of varying

degrees of severity, and after three years of clinical observation checked these by a repetition of the former measurements.¹² The malignant cases showed an enlargement of the blind spot toward the point of fixation, and, as the myopia

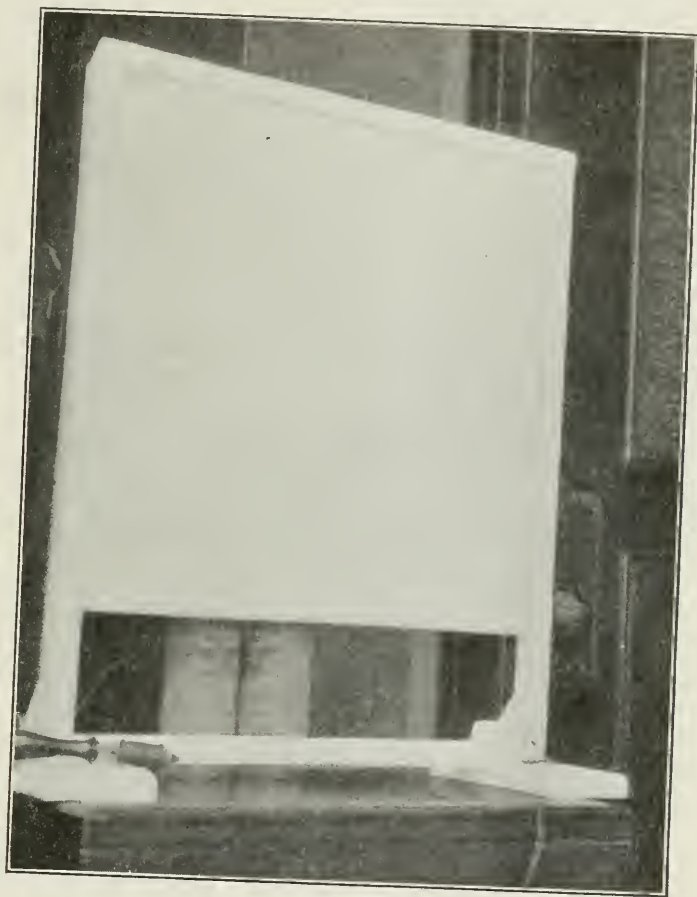


FIGURE I.

Front surface of screen.

increased in severity, the internal edge of the spot advanced. This was irrespective of the degree of myopia, but was in direct proportion to the reduction of vision during the period of observation. But as no deductions concerning the increase

in the degree of the myopia could be made, Cantonnet came to the conclusion that an enlargement of the blind spot towards the point of fixation, or an advance of the internal border of the blind spot, was indicative of a poor prognosis in myopia regarding ultimate vision.

Although much can be learned from the ophthalmoscopic study of the myopic fundus, but little regarding the ultimate vision can be foretold. The retinal area between the disc and the macula is the area upon which the acuity of central vision depends. For, although this area does not play an important rôle in central vision, a disease located here could easily affect the nerve fiber layer, through which passes the papillomacular bundle. Therefore, a determination of the vitality or resisting power of this area is of importance from the standpoint of prognosis. This, Contonnet believes, can be more easily determined from the field of vision as shown by blind spot examinations than by the ophthalmoscope or determination of refractive errors.

Bjerrum⁷ arrived at practically the same conclusions as the previously mentioned author, although from a smaller number of cases and with a less complete comprehension. He emphasized that the enlargement of the blind spot in myopia is due to peripapillar atrophy. One phase of this atrophy, namely, the choroidal, is visible with the ophthalmoscope; but the extent of the retinal atrophy can be determined only by a measurement of the blind spot. "A large scotoma in this region, reaching close to the point of fixation, is of course by no means a favorable sign, even when the scotoma is not absolute."

My own observations upon the blind spot in myopia have been too limited, both as regards the number of patients and the length of time watched, to be of value. But I am convinced that this symptom is of importance and should receive more attention than heretofore. Several cases of more or less malignant myopia (watched from the standpoint of vision for many years) recently have come to me for measurement of the blind spot. This was invariably enlarged, but, contrary to expectation, did not coincide with the ophthalmoscopic picture. However, the enlargement toward the point of fixation (usually out of proportion to the enlargement in the other directions) did agree with the gradual decrease of visual acu-

ity, irrespective of the degree of myopia. I believe that we should make such measurements in cases wherein we suspect a malignant myopia, and our advice to the patient regarding the use of the eyes may be guided by the character of the blind spot.

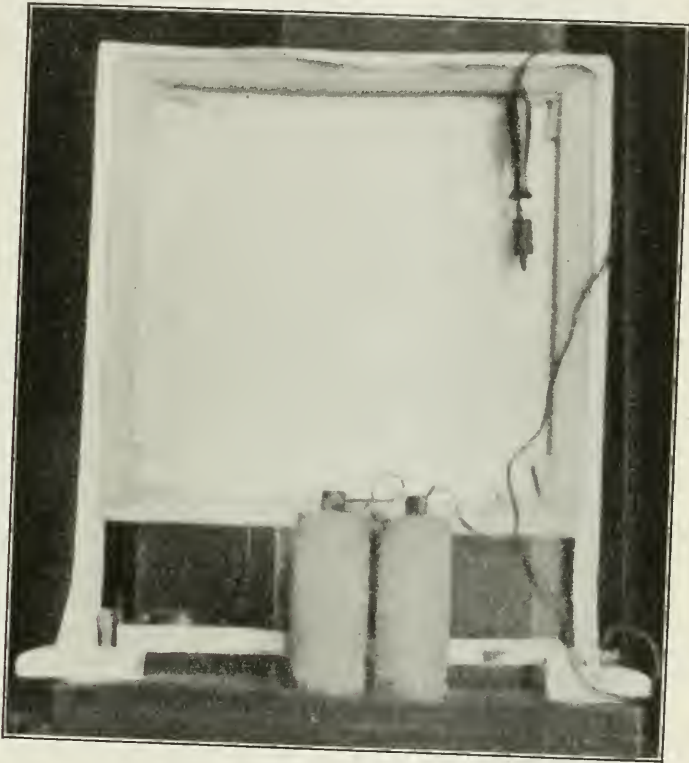


FIGURE II.

Rear surface of screen. Magnet and dry cells.

B.—THE BLIND SPOT IN GLAUCOMA.

The discovery by von Graefe of the importance of the visual fields in the diagnosis of glaucoma was followed shortly by the investigations of Coccia.¹³ This author described, in addition to the true blind spot, secondary smaller blind areas, usually in continuity with the main area, and believed them to

be pathognomonic of glaucoma. He recognized the fact that these areas were the projections of the retinal areas covered by the larger vessels upon their emergence from the disc, but believed them to be pathologic instead of merely exaggerated physiologic phenomena. Aubert¹ agreed with Coccius.

Bjerrum⁷ investigated the visual fields in glaucoma with special reference to the Mariotte region by means of his tangent screen. He found that scotomata are apt to be present around the blind spot, usually in association with a marked sector-shaped defect in the temporal fields. From these investigations he concluded that a peripheral defect, extending from the temporal side into the region of the blind spot, is pathognomonic of glaucoma. In commenting upon this statement, Sinclair⁷⁴ added that in glaucoma the area of most acute vision and the area of relative defect (sector-like defect in the temporal segment of the field) may be said to meet at the blind spot. Priestley Smith⁷⁷ insists upon an investigation of the blind spot in every case of suspected glaucoma.

C.—THE BLIND SPOT IN RELATION TO MEDULLATED NERVE FIBERS.

In 1909, Landolt¹⁸ published the results of his measurements of the blind spot in three cases with medullated nerve fibers. He used a perimeter and found that the blind spot was enlarged in an irregular manner corresponding to the ophthalmoscopic picture of the anomaly. From these cases he reasoned that the medullary nerve sheaths are completely opaque, although he neglected to state whether the enlargement of the blind spot was absolute or merely relative.

Kleczkowski⁴⁵ agreed with him in practically every detail in a similar work.

Unfortunately, I have had the opportunity of making such measurements in only one case of medullated nerve fibers. Here the typical anomaly existed in a practically emmetropic eye, and I was unable to find any change from the normal in the size of the blind spot. Reasoning *a priori*, an enlargement of the blind spot due to medullated nerve fibers should not be expected unless the medullary sheaths are a great deal thicker and denser than the same sheaths within the track of the optic nerve proper. According to Helmholtz,³⁵ "The majority of the nerve fibers emerging from the nerve head lie free, * * * and are sufficiently transparent that light falling upon

them forces its way noticeably into the depths of the nerve proper."

In proof of this statement, he mentions the fact that the bends and curves in the blood vessels can be seen frequently

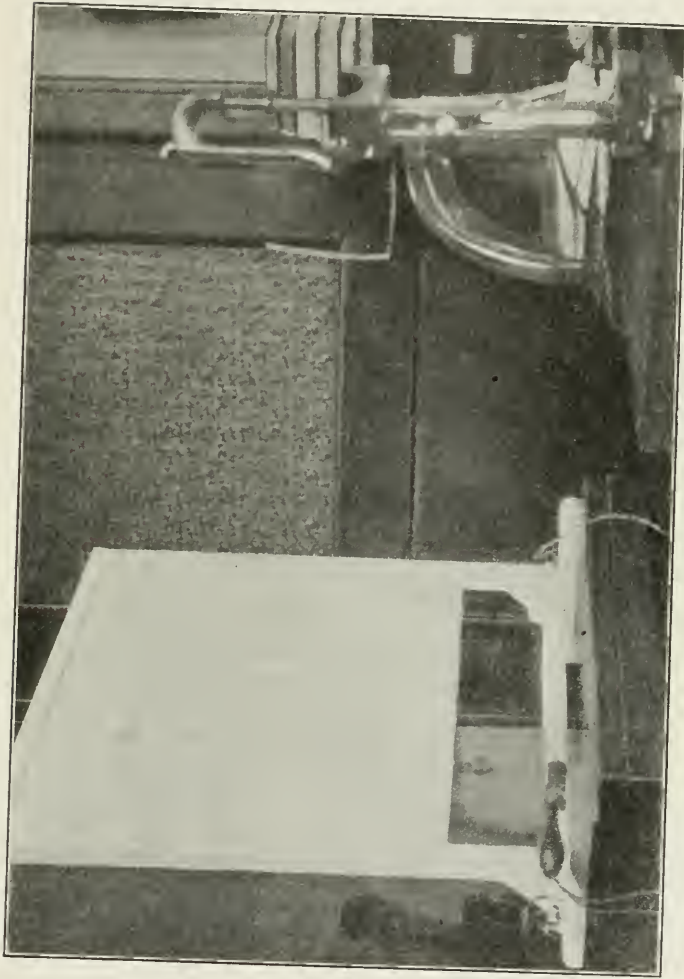


FIGURE III.
Entire apparatus. Screen and chin rest.

after they have entered the nerve and lie behind the lamina cribrosa. Thus light must pass through those fibers which have not yet lost their medullary sheaths, and back again so that the details of the vessels reach the eye of the observer.

Unless the sheaths of these fibers increase in thickness after passing through the lamina, there is no reason to anticipate an absolute enlargement of the blind spot, although a relative enlargement could easily be expected.

D.—THE BLIND SPOT IN SYMPATHETIC OPHTHALMIA.

An enlargement of the blind spot in five cases of sympathetic irritation was reported by Maitland Ramsey and Sutherland.⁷⁹ They found a spindle-like enlargement of this area above and below the horizontal meridian, while the lateral aspects of the blind spot were practically normal. Because of the shape of this peculiar increase in size, they ascribed it to the turgescence of the superior and inferior veins and arteries as the vessels passed from the disc on to the perceiving parts of the retina. But gradually these blind spots became normal in size, although no change in the ophthalmoscopic pictures could be found. No central scotomata were present.

Two years later, Holth⁴¹ reported a similar finding in three further cases of sympathetic ophthalmia of low degree. These, too, disappeared within a comparatively short time. Although no signs of inflammation of the optic nerve could be found, Holth was inclined to ascribe the scotomata to an intoxication of the optic nerve from resorption of products of inflammation within the eye.

Similar cases were reported by Rowen and Sutherland⁶⁷ in 1910 and by Mosso.⁵⁷ The latter author reported upon two cases studied with the Bjerrum tangent screen.

E.—THE BLIND SPOT IN ECLIPSE BLINDING.

Epeleers¹⁷ made an exhaustive study of thirteen cases of eclipse blinding during the summer of 1912. In six of these cases he found a ring scotoma. In eleven of the thirteen cases there was a slight enlargement of the blind spot, not proportional to the other clinical phases of the disease.

F.—THE BLIND SPOT IN TOXIC AMBLYOPIA.

An enlargement of the blind spot as a clinical feature of toxic amblyopia was mentioned by von Graefe²⁶ as early as 1856. But the diagnostic value of the symptom was not recognized by that great ophthalmologist, and it remained for

Leber⁷¹ in 1869 to describe the condition accurately. This author laid emphasis upon the presence of a central scotoma as the main diagnostic feature of a toxic (tobacco or alcohol) amblyopia, and spoke of the occasional associated enlargement of the blind spot. In his first report only one case with the latter symptom had been examined. A great deal of discussion was aroused by this observation, and the question was argued pro and con until the appearance of the first edition of Wilbrand and Sanger.⁸⁴ Their statement that "the bilateral relative scotoma of oval form, embracing the blind spot, must be regarded as pathognomonic of intoxication by alcohol or tobacco" seemed to settle the dispute. The anatomic description by Samuelsohn⁷¹ left no doubt as to the exact pathology of this condition, and his findings were amplified by those of Sachs⁶⁹ with a similar case.

Forster²⁰ maintained that the amblyopia of a tobacco intoxication was due to a negative central scotoma, passing outward from the point of fixation toward the blind spot and occasionally embracing the latter. The scotoma was relative for white but was positive for red, which color must be of the pure or saturated type. On the other hand, Groenow²⁸ described a case of toxic amblyopia in which an enlargement of the blind spot for red was the first recognizable clinical sign. This later became a scotoma for white and eventually a central scotoma of positive type developed. Bunge¹⁰ maintained that the central scotoma found in toxic amblyopia as well as other affections cannot extend beyond the blind spot. This is due to the arrangement of the papillomacular bundles. He described the complete central scotoma as an oval, extending to the blind spot, which was larger than the adjoining end of the central scotoma. Baer² observed a case of toxic amblyopia that started as an enlargement of the blind spot for red and eventually developed a scotoma that assumed the typical oval shape described by Bunge. On the other hand, Berger⁴ insisted that the diagnostic measure of a toxic amblyopia was the contraction of the visual fields.

The greater frequency of central scotomata over blind spot scotomata in toxic amblyopias was explained by Vossius⁸³ by the anatomy of the intraneural bundles. He believed that the seat of the trouble lay in the canalicular portion of the nerve. The papillomacular bundles here are more susceptible to toxic

influences than are the peripheral bundles, for in the center of the nerve are the capillaries, while in the periphery can be found only the small arterial branches. Thus, the toxic substances have greater ease of access to the papillomacular bundles than to the peripapillar bundles. Kuhnt,⁴⁷ on the other hand, believed that central scotomata were due to a greater vulnerability of the papillomacular bundle because of their thinner medullary sheaths.

The clinicians are reasonably agreed that the diagnostic feature of a tobacco or alcohol amblyopia is a relative central scotoma that may or may not include the blind spot. The disease is unquestionably due to a toxemia of the bundles within the optic nerve proper. Combined involvement of the peripapillar and papillomacular bundles seems to be a matter of chance. If any enlargement of the blind spot does occur, it is apt to be irregular, both as to size and direction. But the inevitable central scotoma is greater toward the temporal margin of the field, infringing frequently upon the blind area.

G.—THE BLIND SPOT IN OPTIC NERVE INVOLVEMENT FROM
ACCESSORY SINUS DISEASE.

The recognition of retrobulbar neuritis due to disease of the accessory sinuses was due to the publications of Fuchs²² and Mendel.⁵⁶ These authors found that a central scotoma, usually absolute, was one of the early and important diagnostic signs of this disease. One year previously, Vail⁸² had voiced his belief that suppuration within the sphenoid cavity caused a compression neuritis of the optic nerve at the foramen, but did not advance any clinical evidence. At about the same time Bryan⁹ claimed that a contraction of the visual fields occurred in all cases of sphenoid disease. Harlan³³ believed that the nasal contraction of the field was the diagnostic feature. In contradiction to these statements, Henrici and Haeffner³⁶ reported that they never found any contraction of the visual fields in accessory sinus disease.

In writing of retrobulbar neuritis due to accessory sinus disease, Schieck⁷² seemed to consider the condition dependent upon an edema in the region of the bony canal, rather than upon the severity or the purulency of the inflammation within the sinuses. He did not believe that this etiologic moment could be diagnosed from the ocular condition alone, nor could

the disease be differentiated from the retrobulbar neuritis of a multiple sclerosis or myelitis. He maintained that any involvement of the nerve, such as an edema, could be diagnosed ophthalmoscopically from the appearance of a light cloud arising from the depths of the disc and blurring the outlines of the vessels.

A very complete resumé of the optic nerve involvement from accessory sinus disease was published in 1907 by Birch-Hirschfeld.⁶ He maintained that this condition was not so rare as it was formerly believed to be, and spoke of several cases of amaurosis dependent upon accessory sinus disease with normal ophthalmoscopic findings. The reason for this is that the subsequent descending atrophy of the optic nerve is very slow. To Mendel⁵⁶ he gives credit for the first case of ethmoid amaurosis diagnosed by central scotoma. Jesop,⁴² Fuchs,²⁸ and Paunz³² each published one further case, and Birch-Hirschfeld added three of his own. Owing to the death of one of his cases, he was able to study the optic nerve and found merely a descending atrophy of the papillomacular bundle, corresponding to a central scotoma. Consequently, he maintained that the process was not an interstitial neuritis, but a purely localized one.

In 1909, van der Hoeve³⁹ again called the attention of the ophthalmologic world to the blind spot by reporting a case of retrobulbar neuritis due to ethmoid and sphenoid suppuration and diagnosed by an enlargement of the blind spot. One eye was amaurotic from this cause, and the involvement of the other eye was diagnosed by a blind spot scotoma for green and red, and eventually by a central scotoma with accompanying blindness. An exenteration of the sphenoid resulted in very slow improvement with an ultimate disappearance of the blind spot scotoma, but a persistence of the central scotoma. One year later, van der Hoeve⁴⁰ presented six further cases of retrobulbar neuritis due to ethmoid or sphenoid disease, where the etiologic moment was diagnosed first by a blind spot scotoma for colors and later for white. All of the cases improved after exenteration of the offending cavity.

After commenting upon the various pathologic features of the blind spot that had been described in the literature, the author spoke of the peripheral location of the peripapillary bundles, the interference with which caused an enlargement of

the blind spot. In this connection, he questioned whether it were not probable that an examination of some of the old sections of papillomacular atrophy would show a degeneration of the peripheral peripapillar bundles. That this is extremely difficult to differentiate is shown by the fact that what Fuchs called a peripheral atrophy was proven by Kiribuchi and Greeff⁴³ to be a glia mantel. He did not believe that the anatomic relations of the sphenoid and ethmoids, as described by Onodi,⁵⁸ were of importance, but hinted at a venous transmission of the trouble, mentioning the anterior and posterior ethmoidal artery and vein and the ophthalmic vessels. He questioned whether an edema alone caused the trouble, basing his view upon some experiments performed for him by de Kleijn, who plugged the opening of the sinus. In diseased cases only did there result an enlargement of the blind spot. Uffenorde,⁸⁰ however, suggested that an edema alone was at fault, basing his view upon the edematous areas frequently observed at the inner canthus and around the lids in severe nasal catarrh. He believed that, inasmuch as the relationship of the optic nerve and sinuses was similar to that of the facial nerve and sinuses, a similar edema could attack the optic nerve.

Van der Hoeve stated definitely that enlargement of the blind spot occurred only when the optic nerve was attacked from the sphenoid or posterior ethmoid cells; sinusitis of the frontal, anterior ethmoid, or maxillary alone seldom, if ever, caused this symptom. De Kleijn⁴⁶ supported this statement with figures from the rhinologic clinic. Fifty cases of nasal, frontal or antral sinusitis examined showed only one case of enlargement of the blind spot; but in fifty-two cases of sphenoid or posterior ethmoid disease, the blind spot was enlarged forty-seven times. Usually treatment of the nose brought the blind spot back to normal within a short time. From his own cases and de Kleijn's, van der Hoeve concluded that an enlargement of the blind spot was the deciding factor in determining the presence of posterior ethmoid or sphenoid disease, other factors having been eliminated.

Shortly after the communication of 1909, Snellen⁷⁶ described a case of retrobulbar neuritis with enlargement of the blind spot but without any clinical evidence of sinus disease.

However, curettage of the sinuses cured the ocular condition. A very similar case was published by Hett and Henderson.³⁷ Klare⁴¹ mentioned a case of central scotoma involving the blind spot and due to accessory sinus disease. Gjessing,²⁴ quoting Ham,³¹ said that fifty per cent of the cases that came to the Fuchs clinic for visual disturbances of rhinologic origin showed a blind spot scotoma, at times a functional part of a ring scotoma. Five cases of optic nerve involvement of sphenoid and ethmoid disease in varying stages of severity were described by Rübel.⁶⁸ If the central scotoma had not already embraced the blind area, an enlargement of the blind spot could usually be demonstrated. All cases improved under nasal drainage. In the discussion of Fridenberg's²¹ résumé of the subject, Cohen¹⁴ maintained that he had been unable to demonstrate a single case of enlargement of the blind spot among twenty cases of chronic posterior ethmoid or sphenoid disease. Onodi⁵⁹ observed twelve cases in which the inflammation had spread from the posterior ethmoid cells or sphenoid sinus to the contralateral optic nerve.

Markbreiter⁵⁵ took exception to van der Hoeve's conclusions and based her view upon a review of the literature of one hundred cases of empyema of the sinus. In fifty-two of the number the blind spot was enlarged, twenty-eight of them being without other clinical symptoms. These fifty-two cases occurred in the following empyemas:

Frontal sinus	10
Sphenoid	4
Maxillary and anterior ethmoid.....	3
Frontal and anterior ethmoid	2
Anterior ethmoid	7
Posterior ethmoid	3
Anterior ethmoid and maxillary.....	16
All sinuses	4

In some cases the scotoma disappeared within one hour, after endonasal treatment, and in these cases she attributed the cause to toxic or circulatory disturbances. In those cases where the scotoma remained, she believed that visible changes in the optic nerve had occurred.

V.—SIZE AND LOCATION OF THE BLIND SPOT AND METHODS OF MEASURING.

The early measurements of the blind spot were made at varying distances from the eye and with various forms of marks, usually upon a sheet of white paper. The results thus obtained were not transcribed, but the actual figures shown. Thus, Hannover³² measured the blind spot in the human eye and found his reduced measurements to coincide with the size of the disc, measured anatomically. Donders¹⁵ arrived at the same results, only more accurately; Snellen and Landolt⁷⁵ measured the blind spot by having the eye follow a small perimeter object until the zero mark on the perimeter disappeared and then reappeared, thus outlining the area in question. The measurements thus made were used to calculate the distance between the disc and the macula according to the following formula.

D—Distance.

F—Nodal point of eye. $D = 2 F. \sin. a/2.$

a—Visual angle formed. $D = 3.915 \text{ millimeters.}$

They found this distance to be greater in hyperopia and less in myopia of a moderate degree; but in the higher degrees of myopia the distance was increased, owing to the axial lengthening of the eyeball. They agreed with Aubert¹ that the average blind spot extended from $12^\circ 30'$ to $18^\circ 30'$ on the temporal side of the point of fixation; was oval, with the vertical axis slightly greater than the horizontal; was greater for colors than white; and was surrounded by a zone of relative amblyopia, about one degree in size. Sinclair,⁷⁴ working with the Bjerrum tangent screen, agreed with these data, but found that the surrounding zone of relative amblyopia varied inversely with the size of test object. The outer limits of this zone were somewhat irregular and extending from them were projections corresponding to the larger vessels as they left the disc. These irregularities were only relative.

Helmholtz³⁵ said that the blind spot ordinarily is not visible because of binocular vision, or in case one eye is closed, because the blind spot is being changed in position constantly by the movements of the eye, or because the illumination of the field of vision is not uniform. If these factors are elim-

inated, measurement of the actual size of the blind spot is not difficult. But it is difficult to obtain accuracy in such an investigation, for the average individual with normal acuity of central vision has very poor peripheral vision. Sulzer⁷⁸ estimated that at 14.37° from the point of fixation, the vision equaled only $1/22$ of the normal; while at 16.17° from the fixing point, the vision was only $1/45$ of the normal. Hence it is extremely difficult to localize the outlines of the blind spot accurately. Further, as Ovio⁶⁰ has pointed out, the retina immediately around the blind spot becomes more easily fatigued than near the macula, more especially for colors than for white. By means of his scotometer, Berry Haycraft³⁴ showed that the relative amblyopic zone around the blind spot is color blind: i. e., all colors appear gray at the margin of the area, becoming recognizable in the following order: blue, yellow, green, red. Ovio⁶¹ later showed that the blind spot is smaller when measured with a radiant mark than with a dark mark. He attributed this partially to the effect of irradiation, but to a greater extent to diffuse reflection and false dispersion on the part of the retina. Polaminti⁶⁶ spoke of the size of the blind spot for colors.

Up to 1905 the blind spot had usually been measured with a perimeter or some similar means. But the introduction of the tangent screen by Bjerrum⁷ made possible more accurate measurements of this interesting area. His chart is so well known that it needs no description. At the usual working distance of two meters, with a six-millimeter test object, the blind spot measured about seven inches in diameter. It corresponded in all details with the description given earlier by Snellen and Landolt.⁷⁵ A year later, Priestley Smith⁷⁷ introduced a modification of the Bjerrum screen, investigating only the 5° , 10° , and 25° meridians. He accomplished this by having a central fixation and rotating the chart with fixation marks at these circles. The Bardsley³ scotometer was similar to the Priestley Smith. Berry Haycraft³⁴ published the description of a scotometer with a black metal plate, bearing a nail that traveled in both directions. This could be used only for measuring central scotomata and the blind spot. The Haitz²⁹ stereoscopic chart has proven very satisfactory for outlining roughly the limits of the blind spot; but accurate work is impossible with this instrument. Both Duane¹⁶ and

Peter⁶⁵ have published modifications of the Bjerrum screen without adding any radical improvements.

I have found two main objections to the use of the Bjerrum screen and its innumerable modifications. First, the disc used for measurements is usually held by some sort of a rod, which, although black, detracts the patient's attention from the disc itself. Consequently the mental attention of the patient is not riveted upon the test object, and, as a result, absolute fixation is not maintained. Second, the pins used for marking the area are constantly visible and aid in detracting the attention of the patient.

To overcome these difficulties I devised the following apparatus:

The screen consists of a solid, opaque piece of white cel-luloid, one-half meter square. It is contained in a metallic frame and held upright by a simple standard. The posterior surface of the screen is divided into centimeter squares. Shaded from the eye of the patient is a small electric lamp, actuated from a push button under the patient's control. The discs used are blued steel ball bearings of various sizes and are rolled over the anterior surface of the screen by a magnet, held on the posterior surface and actuated by two dry cells. The patient's head is fixed by a chin rest at sixty centimeters distance from the screen. Attached to this chin rest is a small white wire with a black tip, one-third of the distance between the eye of the patient and the screen. The tip is on a direct line with the eye and the point of fixation, and serves as a control for fixation, in case the patient's head becomes moved from the original position.

As the apparatus is rather large and a considerable time is required for a careful measurement, I always make a preliminary rough estimation of the size of the blind spot with the Haitz binocular chart. This will show whether there is any appreciable change in the size of the area to be investigated. In using my modification of the Bjerrum tangent screen, I place the screen at sixty centimeters distance from the patient's eye. The black tip of the small wire is used to determine the point of fixation on the screen, and this point is then marked with a pencil. The ball is held against the anterior surface of the screen by the hand until it comes within the field of the small electromagnet held behind the screen.

Using the magnet as a director, the disc is rolled over the screen until it enters the blind area. As soon as the disc becomes invisible to the patient, the operator is notified by means of the small electric flashlight. I adopted this method, because any exclamation tends to cause small movements of the chin and entire head, disturbing absolute fixation. The moment the light flashes, the operator marks the location of the tip of the magnet on the posterior surface of the screen with a pencil. The ball is then rolled back into view and the process repeated in another meridian. After the exact size of the blind spot has been mapped out on the posterior surface of the screen, this finding is transferred to a millimeter chart, each centimeter of actual size being reduced to two millimeters for purposes of convenience.

It is not the purpose of this first communication to speak of the results of my investigations on the blind spot. I am reserving the findings as to the normal and pathologic blind spot for a later communication, and hence shall proceed directly to give a summary of this communication.

SUMMARY.

1. A rough measurement of the blind spot can best be made by use of the Haitz binocular chart.

2. If further investigation be desirable, a tangent screen offers the most accurate methods. In using this technic a double fixation should be provided for the patient's eye. The investigating disc is a blued steel ball, held to the surface of the screen by a magnet behind the screen. Thus there are no other moving objects to attract the patient's attention.

3. The blind spot has been found to be of diagnostic and prognostic significance in toxic amblyopia, optic nerve involvement from accessory sinus disease, myopia, medullated nerve fibers, sympathetic ophthalmia, and eclipse blinding, and consequently should be investigated in all of these conditions.

4. If the investigations be conducted along the lines I have spoken of, much valuable information, heretofore hidden from the average observer, will be revealed.

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XXIX.

COMPLETE LEFT LATERAL HEMIANOPSIA WITH
GLYCOSURIA AS A RESULT OF
SLIGHT TRAUMA.*

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It is the combination of a complete lateral hemianopsia with a transient glycosuria, without sensory or motor symptoms, that gives to this case its especial interest.

Mr. J., aged sixty-six years, who was referred to me by Dr. L. C. Stocking, his family physician, gave the following history:

While walking on the street in the latter part of August, 1914, he slipped and temporarily lost his balance. By a strong muscular action he regained his equilibrium. When he reached his office, which was only a very short distance away, he sat down to make out some papers, which he did with difficulty. Very shortly he had occasion to cross the room, and in so doing stumbled over someone who was on his left side. This followed almost immediately after reaching his office.

Examination of the patient showed a well preserved man with normal heart and lung action, with blood pressure one hundred and fifty. Excretory and secretory organs were apparently functioning normally. Normal gait and posture, except slight inclination to turn the head to the left. Reflexes normal, appetite and sleep also as usual, no deviation of the tongue on protrusion, cheeks inflated normally, equal strength on both sides of the body. There was some hardening of the arteries. No motor or sensory disturbances were discovered.

Report from Dr. Stocking, who had examined the urine a

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few days prior to this time, showed normal urine, no albumin, no sugar, no casts. Two or three tests had been made in the weeks immediately preceding this injury and showed a complete absence of sugar and albumin. Examination a few days later showed large quantities of sugar, which persisted for a time but in lessened quantity. The quantity of the urine was not noticeably increased. Blood pressure remains at one hundred and fifty. Sugar entirely disappeared about two months later and has not since reappeared.

Acuity, right and left eye, 20/12, promptly, no ametropia. Presbyopia was corrected by + 3.00 diopter lens. Muscle balance, pupillary reflexes and fundus absolutely normal, except for some angiosclerotic changes. Fields, both right and left, showed left lateral hemianopsia, complete for both form and color, with retention of the central field of about ten degrees. No central color scotoma, and the right sides of the fields were normal. There was no hemiplegia, no anesthesia, no aphasia.

By a left hemianopsia I have reference to the loss of all perception of light in that half of the field. In this case there was retention of the central vision corresponding with the fields supplied by the maculopapillary bundle of fibers.

Differentiation should be made in the use of the terms glycosuria and diabetes, glycosuria meaning the presence of sugar in the urine, either temporarily or permanently, due to some exciting cause. It may be due to some functional or organic disturbance. This condition should not be confused with diabetes mellitus. In many of the cases reported the terms have been used, apparently interchangeably. In this case the glycosuria was temporary.

I wish to state briefly the course of the optic nerve fibers in order that we may have a better idea of the possibilities in this case. The optic radiations start in the region of the cuneus, pass back and then forward to the optic thalamus, and then from the pulvinar to the corpora quadrigemina and forward in the optic tract to the chiasm, where a partial decussation takes place. The fibers from the right side of the brain supply the right side of the right eye, also the right side of the left eye, which parts are concerned in the left half of the visual field. A similar condition, of course, obtains regarding the fibers from the left side of the brain.

Diabetes is one of the oldest known diseases, being referred to by the Roman Celsus and the Greek Aretæus, both of whom lived in the first century of the Christian era; also by the early East Indian physicians as a condition characterized by copious secretion of urine, extreme thirst, and emaciation. Little if anything was, however, added to the subject until the latter part of the seventeenth century, when Thomas Willis (1622-75) in England, first inferred from its sweet taste the presence of sugar in the urine. Moreover, it was not until another century later, 1775, that Matthew Dobson, also an Englishman, actually obtained sugar from urine.

Inseparably associated with the subject of glycosuria is Claude Bernard, who first discovered that glycosuria could be produced by puncturing the floor of the fourth ventricle. Since that time there is perhaps no subject in medicine to which has been contributed so much knowledge from an experimental side as this very one, and yet there is no subject as to whose true pathology and etiology we possess proportionately less accurate information.

Loomis states that it is a well established fact that mechanical irritation of a certain area of the medulla, an area corresponding very closely with the vasomotor area in the fourth ventricle, invariably produces glycosuria, and clinical facts prove with a great degree of certainty that diabetes (glycosuria) is frequently the result of lesions producing similar irritations. Such irritations may result from general shock, concussion, cerebral hemorrhage, softening, cirrhosis, abscess or tumors, also from excessive mental labor, shock, grief and possibly from the excessive use of cerebral stimulants.

Garrod states that some varieties of glycosuria do not call for any treatment, for example, the transitory excretion of sugar in cases of cerebral hemorrhage. Church and Peterson state that hemianopsia is frequently present immediately after the stroke, but usually passes away in a few days with the other sensory disturbances. When the visual path at the sensory crossway is injured, hemianopsia persists.

Hemianopsia is the result of: (1) Disease of the optic nerve and chiasm; (2) lesion of the fibers that proceed from the basal ganglia to the cortical visual area; (3) lesion of the cortical visual area.

In hemianopsia due to a lesion from the chiasm, the divid-

ing line is sharply cut, except perhaps at the fixation point; here the retina is supplied by neurons whose fibers are connected with both cortical centers.

The deviation of the dividing line begins as a rule about ten degrees above and below the point of fixation and extends about five degrees into the amblyopic half. The dividing line may be exactly vertical, it may be somewhat oblique, or it may extend around the periphery of the seeing half for a short distance above or below. These peculiarities are explained by supposing an irregularity in the decussation of the centripetal fibers.

The development of hemianopsia dependent on disease affecting the optic nerves, chiasm, tracts and primary visual ganglia is slow, as a rule, and is unattended by symptoms other than those of basal cerebral disease. If due to tumor or cyst posterior to the basal ganglia, the development may be slow, encroaching on the visual fields gradually. In the greater number of cases, due to lesion posterior to the basal ganglia, the onset is sudden and the hemianopsia is complete, the lesion being due to hemorrhage, embolism or thrombosis of the vessels supplying this portion of the brain.

It is well recognized that persistent glycosuria or even grave diabetes may follow disease or injury of the central nervous system, or even a severe psychic shock, but we do not know how large or how small a part may be played by the pituitary gland in this connection.

Anders and Jameson report an interesting relation of glycosuria to pituitary disease, and give a report of cases with statistics. Robin reports a case of temporary glycosuria following cerebral concussion, sugar lasting four days. Lancereaux says that glycosuria following traumatism is much less serious than other varieties. It is temporary, it may disappear in a few days, and it never continues longer than a few months.

Glycosuria or a true diabetes may occur in organic lesions of the brain without Bernard's diabetic center being necessarily involved. Glycosuria is not infrequent after cerebral hemorrhage. It rarely appears earlier than two hours after the apoplexy and usually clears up within six days.

Landois and Stirling state that a continued stimulation of peripheral nerves may act reflexly upon the center or the vaso-

motor nerves of the liver. Diabetes (glycosuria(?)) has been observed to occur after stimulation of the central end of the vagus, and also after stimulation of the central end of the depressor nerve. Even section and subsequent stimulation of the central end of the sciatic nerve causes diabetes (glycosuria(?)). This may explain the occurrence of diabetes (glycosuria(?)) in people who suffer from sciatica. It may also occur after perverted nervous activity, as psychic excitement, neuralgia (sciatic, trigeminal, or occipital), and concussion of the brain, as well as after certain injuries to the skull and vertebral column and some cerebral diseases. It is commonly admitted that experimental glycosuria is caused by a centrifugal stimulus from the nervous centers to the liver, either through the vasomotor system or direct stimulus to the liver cell.

Glycosuria has been known to originate in nasal obstructions and to disappear when these were removed.

Higgins and Ogden report the result of examination of two hundred and twelve head injuries, and conclude: (1) That after injury sugar may appear in the urine as early as six hours and disappear within twenty-four hours; the average time for its appearance, however, being from eight to twelve hours; and for its disappearance, from the fifth to the ninth day. (2) That a small portion of the cases may exhibit permanent glycosuria from the date of injury to the head.

Pozzo refers in particular to the transient glycosuria which may accompany infectious processes. Becker found it present in two or three per cent of several thousand cases of phlegmons, erysipelas, etc., and others have noted it in various acute infectious diseases as well as with surgical affections and under the influence of certain poisons.

Therefore, while we must admit that the nervous system has something to do with the production of diabetes (glycosuria(?)), sometimes directly and in other instances indirectly, we are not able to trace a nervous lesion in every case. It is further likely that the sympathetic nerve is an important channel for nervous influences, regulating as it does the opening and closing of the blood vessels.

Dr. Weil quotes the following from Prof. Carl von Noorden, one of the greatest authorities in the world on diabetes and glycosuria:

A large number of lesions have been discovered, both in man and in animals, each capable of causing glycosuria referable to the disbursement of glycogen.

Among others are the following: Destruction of the superior and inferior cervical sympathetic ganglia and other sympathetic nerves of the first dorsal ganglion of the abdominal sympathetic; stimulation of the central end of the cut vagus nerve; painful stimulation of the peripheral nerves; psychic disturbances; injury to various parts of the cerebral hemispheres, the mid-brain and cerebellum. (See Weil's paper for notes of fourteen cases of diabetes caused by falls or blows.)

F. M. Allen, in his recent exhaustive book on glycosuria and diabetes, writes: "No one doubts the frequency of transitory glycosuria following trauma of the central nervous system, or that the nervous disturbance is the cause of the glycosuria."

Fletcher also says that organic lesions of the brain, such as cerebral hemorrhage, may cause glycosuria; that it rarely appears earlier than two hours after the apoplexy, and generally clears up within six days.

"So great has been the influence of Claude Bernard's discovery on the views of the profession upon such matters that it has been assumed that most of the cases in which cerebral lesions, such as hemorrhages, tumors, and meningitis have occurred, have been followed or accompanied by glycosuria. This has been due to an implication of the glycosuric center. In some instances there has been evidence of such extension, but in many cases there is none, and it is uncertain whether a persistent glycosuria is ever attributable to a lesion of the glycosuric center."

Halstead's opinion is that shock, particularly concussion of the cerebrospinal axis, is the principal etiologic factor in traumatic glycosuria.

Diabetes (glycosuria(?)) sometimes causes amblyopia, and it is characterized by a central color scotoma. Central scotoma for white may also be present. The visual field may be normal or contracted, or may be hemianopic. The prognosis is unfavorable, although useful vision may be long retained.

As a result of or associated with diabetes insipidus, a number of writers have reported hemianopsia, epileptoid attacks,

optic neuritis, and symptoms of cerebral tumor; but it is probable, as Knies has suggested, that in these cases the polyuria was only an incidental effect of a lesion in the floor of the fourth ventricle, which was the real cause of the symptoms referred to.

Apart from the cataract of diabetic patients, and those retinal and optic nerve lesions that so closely resemble the fundus changes found in Bright's disease, there is sometimes observed a dimness of vision that simulates the amblyopia from tobacco and alcohol. There are in these cases no alterations visible with the mirror, but central scotomata for red and green can always be mapped out.

The diagnosis is somewhat difficult when the diabetic patient is a smoker, but in such instances the color defect often extends to blue and white. In time white becomes involved at the periphery of the field also, a condition of things never found in pure tobacco and alcohol amblyopia.

In addition to the affections of vision already described in connection with diabetes (cataract, retinal hemorrhages, etc.) there occurs in this disease an amblyopia, in which the visual field is sometimes intact, sometimes peripherally restricted, occasionally hemianopic, but in which there is a color scotoma, and, moreover, in cases not addicted to the use of tobacco or alcohol.

We must not, however, forget to mention that concentric narrowness of the field of vision is said to be one of the symptoms of arteriosclerosis of the vessels of the brain.

Howard F. Hansell reported in 1901 the case of a patient who had suffered for years with diabetes, and who showed irregular hemianopic fields with detached scotomata. There was present also an atrophy of the optic nerves, with reported failing vision for six years.

Lawford describes the complications in diabetes as failure of accommodation, mydriasis, increase of refraction, paralysis of ocular muscles, keratitis, iritis, iridocyclitis, cataract, retinitis and diseases of the optic nerve, but does not mention the possibility of a hemianopsia.

Optic nerve disease has been described by Leber under these headings: (1) Amblyopia without ophthalmoscopic changes, and with or without limitations of the field. (2) Atrophy. (3) Hemianopsia. He believes that in the few cases of hemianopsia reported, the defective vision was not

due to the glycosuria, but to the localized intracranial disease.

Galezowski reports the case of a man, fifty-eight years old, with myopia of 5 D., who had suffered for two years with right homonymous hemianopsia that had appeared suddenly. He sought advice on account of a diabetic keratitis, which Galezowski was inclined also to refer to a central disturbance.

Wilbrand reports a diabetic with hemianopsia and scotomata, who a few weeks later had an apoplectic attack with paralysis, showing atheromatous vessels.

Herschel reports a case in which after an apoplectic attack a bilateral nasal hemianopsia appeared which was limited by a vertical line passing through the point of fixation.

In hemianopsia due to hemorrhage or to thrombosis, partial or complete recovery of vision may be expected in a small percentage of cases. If recovery is to take place, it begins almost without exception before the end of the sixth week. Hemianopsia due to a lesion of the optic radiation is only in extremely rare cases an isolated symptom. Its associated manifestations may be few or comparatively many. It may, for instance, be part of a symptom complex which includes word blindness, mind blindness and word deafness, with other symptoms so often combined with these forms of sensory aphasia. If the lesion is deeply placed so as to implicate the posterior portions of the posterior half of the internal capsule, hemianesthesia may be present, as may also impairment or loss of the muscular sense and of stereognostic perception. When hemiparesis occurs with hemianopsia which can be referred to the optic radiations, the lesion is usually an extensive one.

The foregoing are some of the associations by means of which one is enabled, with some approach to certainty, to conclude that the lesion causing the hemianopsia is subcortical. Hemianopsias, cortical or largely so, are usually distinguished by the absence of such symptoms as hemianesthesia and the various symptoms classed under the general head of visual and auditory aphasia, but if both cortex and subcortex are involved, the associated clinical phenomena will depend upon the depth and the extent of the lesion.

Hansell also says that hemianopsia, optic nerve atrophy and amblyopia are probably but indications of the three stages of one affection—namely, retrobulbar neuritis, terminating in atrophy.

Schmidt-Rimpler says: "If the retrobulbar neuritis be so extensive that it has caused symmetric loss of an entire half of the field of vision, it usually progresses farther and does not suddenly cease. At the same time, after disappearance of the inflammation, a more or less extensive white discoloration of the papilla begins. This occurs very late, or not at all, in cases of intracranial hemianopsia."

As regards the case which I am able to report, at the present time, nine months later, there has been a slight change in the hemianopsia, light perception having begun to return in the left side in the upper quadrant. The sugar has entirely disappeared.

Bernheimer has proven that the crossed optic fibers occupy mainly the lower part of the chiasm, whereas the noncrossed fibers are restricted to the upper half and form a closed bundle. The relation remains the same in the adjoining part of the optic tract; the noncrossed fibers occupy the upper, the crossed ones the lower part.

A lesion confined to the cuneus or to the gray matter immediately surrounding it on the mesial surface of the occipital lobes produces homonymous lateral hemianopsia without motor or sensory symptoms, at least without these as a direct consequence of the lesion.

If the lesion produced a hemiplegia and a hemianesthesia, the trouble would probably encroach upon the posterior portion of the internal capsule.

If the preserved fields are accompanied by concentric contraction, the smaller half field will be in the eye opposite to the lesion. Contraction of the preserved half field is most common with lesions of the cortex, but also may occur in lesions of the tract.

If the hemianopsia is relative, the lesion must be in the cortex: elsewhere it produces absolute hemianopsia, but cortical lesions are not excluded by absolute hemianopsia.

A lesion producing typical hemiplegia, aphasia (if the right side is paralyzed), little or no anesthesia, and lateral hemianopsia, is probably due to disease in the area supplied by the middle cerebral artery.

A lesion causing hemianesthesia, ataxic movements of one-half the body, no distinct hemiplegia, and lateral hemianopsia could be situated in the posterior lateral part of the optic thalamus.

A lesion causing the symptoms of disease of the base of the brain associated at the same time with changes of the pupil, changes in the nerve head and lateral hemianopsia, could be situated in one optic tract or in the primary optic centers on one side.

In this case we have the complete lateral hemianopsia with the presence of sugar in the urine as a complication resulting from what seemed an apparently trivial incident. Guided by the suggestions laid down by Sequin, the fact that this patient had a complete hemianopsia while he did not have a hemiparesis, hemiplegia, hemanesthesia or any of the aphasias, leads me to place the site of this lesion, cerebral hemorrhage, not subcortical nor encroaching upon the internal capsule, but in the gray matter of the cuneus itself. The glycosuria is but an expression of the severity of the shock.

The angiosclerosis acted as a contributing cause and the slip as the exciting cause of the hemorrhage.

The question may arise as to whether the slight slip and the effort to regain his equilibrium caused the hemorrhage or the hemorrhage cause the slip. But there was no dizziness or discomfort complained of at the time of the accident.

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XXX.

THE MYDRIATIC ACTION OF DEXTROHYOSC-
CYAMIN.*

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During the winter of 1911-1912, while performing some experiments in the anatomic laboratory, under the direction of Prof. R. J. Terry, we discovered a property of dextrohyoscamin which had hitherto not been described. We found that dextrohyoscamin, dropped into the conjunctival sac, dilated the pupil to the maximum, having very little or no effect on the accommodation. Cushny had previously reported the results of his experiments on animals, both by local application and by hypodermic injection; principally the latter. Naturally the effect on accommodation could not very well be studied on the animals.

In his work on pharmacology, published in 1910, he states "that atropin has been shown to be a mixture of equal parts of natural, or laevohyoscamin, and that of its dextrorotary isomer, which differs from the ordinary or laevohyoscamin, in the way it rotates polarized light.

"Dextrohyoscamin does not exist free in nature, and possesses only a feeble action on the nerve terminations, while it stimulates the spinal end of the frog more than either atropin or hyoscamin. The peripheral action of atropin is

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thus due to its containing hyoscyamin; and as a grain of atropin contains only one-half a grain of hyoscyamin, the former exercises only half the effect of a grain of hyoscyamin. On the other hand, the half grain of dextrorotary hyoscyamin in a grain of atropin is almost inert on the nerve terminations, but exercises the same effect on the central nervous system as its laevorotary complement. Atropin thus acts on the central nervous system in mammals in the same strength as hyoscyamin, but only half as strongly in the periphery."

Our experiments were chiefly concerned with the local application of dextrohyoscamin in man. We found that a one-half per cent solution of dextrohyoscamin instilled in the human eye caused a dilatation of the pupil to a width of from five and one-half millimeters to eight millimeters in about forty minutes, lasting on an average twelve hours, before returning to the original size. Also that the accommodation was disturbed very slightly in most cases, and in some cases not at all.

For example: Mrs. B. L., age twenty-four years. Pupils three millimeters at 8:30 o'clock, when the dextrohyoscamin was used. At 9:30 o'clock pupils were eight millimeters, and her near point for 0.5 D. was four inches.

Mrs. L. S. K., age thirty-two years. Pupils three millimeters at 8:30 o'clock, when the dextrohyoscamin was used. At 9:30 o'clock pupils were seven and one-half millimeters and her near point for 0.5 D. was five inches.

Mr. S. J. S., age fifty-two years. Pupils were three millimeters at 8:30 o'clock, when the dextrohyoscamin was used. At 9:30 o'clock pupils were seven millimeters. His distant vision 14/14 with — 1.5 D. S., and his near point eight inches with + 1.25 D. S.

We found, after a short while, that the accommodation was affected for a much more considerable period and to a much greater extent in some individuals than others, and we discovered that this was due to the solution not being perfectly fresh, the dextrohyoscamin rapidly changing to the laevorotary form when in solution, and affecting the accommodation like atropin. We corrected this by keeping a one-fourth grain of dextrohyoscamin powder in a one dram bottle, and filling the bottle with water just at the time of using.

Later we persuaded the firm of Burroughs, Wellcome &

Co., which was the only chemist from whom we were able to obtain the drug at all, to put it up in tabloid form ready to introduce in the conjunctival sac. This form is stable and effective. One objection is that it causes a sensation of rather severe burning for about a minute after being introduced in the conjunctival sac, which is not the case when the solution is used. We are endeavoring to have this remedied.

We have seen no detrimental effects on the eye from its use on a series of several thousand patients.

It has been used as a daily routine in the office of Dr. H. L. Wolfner and myself for the past three years for dilating the pupil for examination of the fundus, and for making the shadow test in refraction, and has proven satisfactory.

Its advantage over euphthalmin is that it dilates much more quickly and more effectively. Its only disadvantage is its unstable quality in solution; or in the use of the tabloid, a temporary uncomfortable burning sensation.

CONSCIOUS VISION IN DEVELOPMENT OF
AMBLYOPIC EYE.*

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When the bodily functions are carried on in a normal way they are performed automatically and without conscious effort on the part of the individual to whom they belong. It is almost an aphorism that when we become conscious of an organ, something is wrong with it. This in itself is usually an evidence of a disturbance which needs correction.

Of course we all recognize the fact that there are voluntary and involuntary activities in every animal body. There are also those which may under certain conditions be voluntary, and under others involuntary. With the well known natural physiologic divisions the present paper does not concern itself. But all of the special senses may be either consciously or unconsciously activated.

It may be assumed that in the presence of a stimulus having an influence upon any of the organs of special sense, the organ itself and its receptive centers being in normal condition, there is always an effect produced. This effect is not by any means always a conscious one. For example, it is quite possible for one with perfect hearing to be so much occupied that his own name may be called several times before a sufficient response is obtained to awaken his consciousness to the fact that vibrations have been excited in the ear. An odor may be present without our recognizing its existence until our attention has been called to it, when it produces an effect decidedly agreeable or the reverse. An appreciation of either the sound or the smell is the result of voluntary attention.

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If we were able to analyze the manner in which a child first becomes conscious of the existence of the world surrounding him, we should find that the impressions produced upon his retina, and translated with an intelligent visual conception, were at first vague and indefinite. The eyes roll aimlessly in the orbits, and no attempt is made for some months to fix them upon any single object. That to which his attention is first attracted is something of a striking character—as a light, or a mass of brilliant color. Gradually a response is obtained from the larger objects, and the eyes follow, but vaguely, a moving form. Then, with the awakening of intelligence, which is shown in the face of the baby, there is greater certainty in the muscle movements, and the eyes are directed toward the object with interest and curiosity. Finally, the act of seeing, like that of the other senses, becomes to a degree automatic, and the impressions are carried through the channels which have been established, but mentality is increased just to the degree that the attention is fastened upon the object seen.

It is the purpose of this paper to emphasize these facts, which have not received the attention that their importance deserves:

First: That the coordination of the eyes in producing binocular sight is intimately associated with the activating of the brain, and that as its corollary, the dissociation of this function interferes with the power of rapid and accurate thinking. In other words, when the stereoscopic effect of the combined action of the two eyes is imperfectly obtained the stereognostic effect is equally imperfect. The blurring of the combined visual images connotes equally a blurring of the combined mental images. It is not intended to convey the idea that dull sight in itself carries with it a lowering of the mental power, but that the imperfect inclusion of one visual field in the other causes a confusion of thought.

Second: That amblyopia in heterophoria and in heterotropia is the result of a purposeful and conscious suppression of the visual images in the sight center on one side of the brain, and that restoration of the lost function can be accomplished only by an even more definitely conscious direction of the nerve energy from the neurons and through the channels whose functions had previously been inhibited.

Third: It is intended to suggest practical measures by which this end can be attained.

As from earliest infancy impressions of passing objects fall upon the retina in rapid succession, we learn to ignore the existence of the series of moving pictures that do not interest us, and we actually see and retain those only upon which the attention has been so definitely directed that the "negative" is preserved, and a memory, which may be transient or permanent, has been established.

It is now a very well recognized fact in ophthalmology, that when structurally the eyes are organically different, or so imperfectly formed that they are unable to function together easily in producing binocular vision, one of them converges with resultant diplopia. If this were allowed to continue it would be confusing and annoying, if not painful, and the very young child learns to suppress the disturbing image. This suppression, if continued long enough, results in the functional inactivity of the sight center, so that in course of time the inturning eye can no longer see clearly, which was the end sought, and as a consequence an amblyopia is established. The reason that the image is suppressed is because it is annoying. It must, therefore, be consciously suppressed.

It is the endeavor of this paper to show that in order that its functional activity be restored it must also be consciously activated, and that the reestablishment of functions secured in this way is not only an essential in securing parallelism of the two eyes, is not only important in restoring the lost or diminished sight, but has a most vitally important bearing on the intellectual activity of the brain, and therefore is an element of first importance in the correction of every heterophoric condition and of every squint.

In order that my thought may be clear it must be assumed, as it cannot be anatomically or physiologically proven, that every rod and cone in each retina has a terminal neuron in the cerebral cortex.

The interrelationships of the optic nerve fibers would make the impression of the light waves, constituting the retinal images, constitute a double corresponding impression in the cuneus and adjoining structures. It is now pretty well known that the macular fibers extend throughout the inner surface of the cuneus, while the other portions of the retina involve

not only the cuneus, but the adjacent portions of the occipital lobe. It would seem entirely probable that the impulses from these two impressions, in order to make a clearly defined picture which can be translated into a mental image, must be brought together at some point in the brain. The point at which this might be done cannot be in the chiasm, as has been suggested, because in this nervous tract there are no terminal elements. There is a direct connection, however, of both afferent and efferent fibers extending down below the chiasm into the corpora quadrigemina and geniculate bodies. These are directly connected again on either side with the nuclei of the third and other extraocular nerves. We have the complete mechanism, therefore, at this point for the blending of symmetric images into a stereognostic impression.

The relation of all of the external musculature of the eyes, therefore, makes possible a perfect adjustment when the ocular structures are mechanically able to deliver symmetric images to these centers.

When, however, after a number of years in which one of the images has been suppressed, because of the structural nonsymmetry of the eyes, and the habit of holding that impression in abeyance has been established, and even after mechanical readjustment permits like images to be produced, the merging of the images is often difficult to achieve. Hence it is that mere operative procedures, even when supplemented by absolute focal correction, still leave an optically imperfect combination, of which we have the analogue in a stereoscope one of whose lenses is clouded.

In very young children, when the focal differences have been corrected, the normal tendency of parallelism will usually reestablish itself, because those portions of the brain which are symmetrically placed and designed to receive like impressions, even from the stimulus of an occasional impact, will gradually tend to respond.

With every added year, however, of nonuse the difficulties are enormously increased, and it is the general impression that if normal visual acuity with binocular vision is not secured before the sixth or seventh year, the eye remains defective, and may be permanently a source of great discomfort.

The reason that parallelism is secured with such difficulty, even after a right focal correction in the young child has

been made, is that the habit has been formed of using the sight center on one side of the brain only, and that the suppression of the image on the amblyopic side continues.

It is not only possible, however, to restore the sight where it has become dulled from nonuse in those who are no longer children, but its restoration will be associated with all the betterment that comes from the establishment of normal binocular sight. This can be done only by a conscious effort to use the defective visual tract. This refunctioning may be secured in two ways.

First: By compelling the preferential use of the defective eye by making it for the time being the better optically of the two.

Second: In suitable cases directly and consciously using the defective eye in preference to the better one, the other being normally exposed. This is, of course, the purpose of all of the stereoscopes and amblyoscopes that have been devised. These are, however, used only occasionally, and to be effective demand patience and perseverance. The child then becomes impatient and weary of the exercise, and after a short trial these artificial measures are usually given up and laid aside.

The following will serve as an illustration of the first of the suggested methods for the cure of amblyopia and the re-establishment of binocular sight:

In December, 1909, a young man of twenty, for the first time came under my professional observation. He had convergent squint as a young child, and had been correctly refracted at the age of six or seven by one of the most eminent ophthalmologists in the East. He was wearing at the time I saw him the following combination:

R. + 3.50 D. sph., \ominus + 0.50 D. cyl. ax. $90^\circ = 5/5$ with difficulty.

L. + 3.50 D. sph., \ominus + 0.50 D. cyl. ax. $90^\circ = 4/8$ with difficulty.

With his glasses his eyes were usually almost straight. There was frequently a little tendency to converge. Diplopia was obtained only after the most persistent effort by the use of a red glass. When vision was clear in the right under tests the left would slightly converge. It was only when the right was overcorrected to the extent of plus two diopters that definite fixation was obtained by the left.

With R. + 4.50 D. sph., \ominus + 0.50 D. cyl. ax. 75° vision was reduced to $3/8$, while with L. + 3.00 D. sph., \ominus + 0.50 D. cyl. ax. 150° , vision was raised to $6/8$. This combination was, therefore, given to the young man.

Since he could see more clearly with the defective eye under this correction, his natural inclination led him after a short time to use this eye for fixation in preference to the one which he had been accustomed to use.

It was intended that he should report within a few months, but he did not appear again until the end of two years. The report which he was able to make was in many ways a most surprising one. He not only had secured easy and complete binocular vision, he had retained the acuity on the good side, and had developed that of the poor one until it had almost become normal, and for the first time in his life had been able to use his eyes with comfort. Because of the condition of his eyes he had been unable to go to school during his developing years and had been regarded as mentally deficient. With the restoration of binocular vision had come a definite mental betterment; as he saw more clearly, he thought more clearly. As the two sides of the brain had not been able to work together visually, neither had they been able to work together intellectually. The cloud which prevented the blending of visual images had also prevented him from having clear mental pictures. His life history would have had a different reading if the handicap of eyes unable to do team work had been removed in earlier childhood.

The second method is much more difficult psychologically. It can be applied only when the patient is intelligent and willing to cooperate. It consists in the conscious use of the amblyopic eye, the proper refractive correction being employed and both eyes being uncovered. It is exceedingly difficult at first to maintain the fixation of the imperfectly seeing eye. If the better eye is covered and the poorer one allowed to fix, the instant the obstruction is removed the process is reversed. It is so more more comfortable and easy to use the eye in which the sight is clearer. But if the process is repeated, and every conscious effort is made to see by preference with the dull eye, it will be found that this can be done. Fixation can be held, however, only for an instant, the constant tendency being to revert to the accustomed and easy process.

Gradually, as the trick is learned it will be found that it is not so difficult a matter as might be supposed to direct the nervous energy consciously to one or the other eye. Then in the course of time, when this faculty has been acquired, it will be found equally possible to hold the two fixation points together, the preponderance of neuricity passing through one or the other of the optic tracts at will. As this progresses vision increases in the defective eye *pari passu*. Finally, binocular vision will be obtained easily and completely without any suppression on one side or the other, and heterophoria will be found to have disappeared.

The following case is illustrative: A woman, twenty-two years old, had convergent strabismus from the time she was a baby. At the age of seven her refraction had been accurately corrected by excellent ophthalmic surgeons.

She was wearing on August 21st, when first examined:

R. + 0.50 D. sph., \ominus + 2.25 D. cyl. ax. 45°.

L. + 0.50 D. sph., \ominus + 2.00 D. cyl. ax. 135°.

The consciousness that her eyes were not working together, and the fact that they immediately converged when her glasses were removed, made her anxious to secure relief. Diplopia was obtained with great difficulty, when she was found to have an esophoria of sixteen degrees with her correcting lenses. It was evident that she was never getting a perfect blending of the retinal images in the visual center, that one was constantly being suppressed, and that this was occasioning her more subjective discomfort than she was conscious of. In a word, one side of the stereoscope was constantly blurred, and this could be corrected by no focal or prismatic combination. She had not automatically acquired the habit of binocular fixation, because the visual paths had been made along another route before the eyes were mechanically able to focus together. This, then, had become the line of least resistance, and it had been easier all of these years to hold the seeing nerves in a condition of quasi inactivity than to train them to the complete combined activation necessary for harmonious binocular work. Moreover, she did not know that she was not using one eye, and if she had known, she would not know how to bring it effectively into action. Happily, she was an unusually intelligent young woman, and much interested in the problem which was present. As a

preliminary to the subsequent training, and to make the initiative, the tension of the left internal rectus was relieved. A small opening was made in the conjunctiva and the tendon was severed, the check ligaments and all other tissues being left intact. Later experience leads me to believe that nothing is gained by this expedient. There was still esophoria of sixteen degrees with the glasses on, and convergence with suppression of the image on taking them off.

Then began a course of training of the weakened eye. The better eye was covered for a moment and fixation maintained by the poor one. The effort was made to see by preference with the defective eye. Gradually this faculty was achieved. When this was done distant binocular vision become blurred. She could see with both eyes only $3/8$ of normal vision. Thus in her maturity she had consciously and designedly reversed the process in activating the dulled area, which she had unconsciously and unwittingly applied in her infancy in suppressing the visual impressions. The constant tendency was of course to recur to the use of the good eye and to have clear sight, but so anxious was she to make the poor eye effective, that having learned how to use the weakened one, and knowing that use meant development, it became with her an almost constant exercise.

Gradually the sight began to improve. The cloud seemed to disappear. From $3/8$ the vision slowly mounted to $4/8$, then to $5/8$, finally to $6/8$, and with both eyes together, in which binocular vision is secured, to $7/8$. Always, if the left eye is shut out, either voluntarily or by exclusion, the sight is at once clearly $8/8$.

When the glasses are removed there is now perfect parallelism of the axes and absence of discomfort.

This case emphasizes several facts which are not, I think, generally understood or accepted.

First: That the amblyopia dependent upon a suppression of the visual image is not only ocularly annoying, not only a source of profound nervous disturbance, but it may directly affect the keenness of the mental impressions and responses.

Second: Even in adult life the amblyopic eye may be taught to see and the defective sight may again be restored.

Third: That conscious effort may be an important element in the restoration of functional activity in any case of heterophoria.

IS MIGRAINE A FORERUNNER OF GLAUCOMA?*

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In discussing this question the first essential is an understanding as to the definition of migraine and the definition of glaucoma. Migraine, or hemicrania, is a violent boring pain, situated over the eye, in the forehead and above it, and sometimes also in the eye itself. I might add to this that the pain is often continued over the back of the head, down the neck and into the shoulder of the same side. The attack is usually preceded by a disturbance of vision, scintillating scotoma. During the attack the patient feels best if he can lie quietly in a darkened room; glaring light increases the pain, and there is marked photophobia. After the onset of the headache the intensity usually increases, lasting from part of a day to two or three days, and is accompanied by nausea and sometimes vomiting, after which the patient feels better and the attack comes to an end. The tendency is for the attack to come at intervals, sometimes once a month, or at even more frequent intervals. It usually occurs in persons of a highly nervous organization. Almost invariably the attack follows a persistent and continuous use of the eyes that causes considerable strain. These periodic attacks may begin early in life and continue for twenty years or more.

Let us look for a moment at the definition by Mr. Priestley Smith of glaucoma, which has probably been studied more thoroughly by him than by anyone else. He says, in Norris and Oliver's system: "Glaucoma is a complex morbid process, depending essentially upon an excess of pressure in the chambers of the eye."

So far as we know, it was not until 1830 that William

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Mackenzie discovered increased pressure in the eye, called attention to it and made some attempt to relieve the pressure. It was not, however, until twenty-five years later that von Graefe, after thoroughly studying the subject, brought out his famous iridectomy for glaucoma. For years there has been a general understanding that there is a so-called prodromal period in glaucoma antedating the final attack.

Perhaps it was the indefiniteness of the literature in regard to the prodromal period of glaucoma, together with the very great difference of opinion as to its etiology, which set me to thinking. Another reason for my interest in this subject was the discussion with glaucoma patients (that is, patients who came to me for the first time with an acute glaucoma which necessitated an immediate operation) of their previous history. In the discussion of their symptoms I found a number who gave a history of migraine headache, including scintillating scotoma, but who were treated by the family physician for biliousness. In one case I recall, the patient was operated upon for gall bladder trouble, the supposition on the part of the physician being that the trouble was undoubtedly of a bilious nature.

A compilation of the histories, including the previous treatment of patients for supraorbital neuralgia or migraine, would be highly edifying, and, except for the woefulness of inaccurate diagnosis and loss to the patient incident thereto, would be somewhat amusing.

When one's attention is first attracted to the question of migraine as a forerunner of glaucoma, there may not at first appear to be any relationship between them; yet one feels that in view of the possibility of saving patients a loss of vision, as well as time, worry and expense, resulting from acute inflammatory glaucoma, any measure which will modify in a beneficial way or alleviate the condition or perhaps even prevent it, must of necessity be given serious consideration. As the etiology is obscure, we still are bound to attempt an early recognition and diagnosis of the prodromes of glaucoma. It is a well known fact that scintillating scotoma occasionally occurs in migraine, yet migraine occurs without scintillating scotoma; this has been recognized, I believe, for years.

Having become interested in the possibility of migraine being a forerunner of glaucoma, I began taking the tension

by palpation in cases coming either to the office or to my clinics. Occasionally the tension was plus one and sometimes only slightly plus. In order that there might be more accuracy about the matter, I determined thereafter to take the tension of both eyes in all cases presenting the history of recurring attacks of unilateral headache, with or without scintillating scotoma. In all my cases I found the tension up a few points, sometimes markedly so. Occasionally the tension was up in one eye only, the eye on the same side as the unilateral headache. More often the tension was up in both eyes, and in some cases I found that where the tension was up in both eyes the headache had a tendency to become general, although it began on one side; and occasionally cases occurred in which the tension of the eye on the side opposite the one having usually the unilateral headache, was higher than the tension of the eye on the side with the headache.

Invariably in these cases I found that later on the tendency was for the headache to shift, alternately, or at least occasionally, from one side to the other. I can only account for this in that the astigmatism was at an off axis in these cases in the eye on the side of the headache, whereas the good eye was more apt to have the astigmatism with the rule. The usual tension in these cases I found to vary from twenty-two millimeters or twenty-three millimeters to thirty-five millimeters or forty millimeters in some few cases. The average, therefore, was in the neighborhood of twenty-eight millimeters. In other words, there was an increase which was so slight as to be considered normal for some persons. On the other hand, when we consider those patients whose vision becomes normal after trephining, with a tension of thirteen millimeters or fifteen millimeters, we realize that the normal tension has to be considered somewhat as we do blood pressure—i. e., according to body weight and the habit of the individual; that is, whether plethoric or not.

I want to call attention to a point in connection with these cases which seems to me significant. I have yet to examine a patient whose migraine headache was associated with intense photophobia, in whom I did not find chorioretinitis, especially in the central region of each eye, and the exudation or destruction much more marked on the side where the unilateral headache had occurred. Realizing as I do that I am

likely to incur criticism by the following statement, I still beg to offer it to you as my conclusion, after very arduous painstaking investigation of these cases. It is that in cases in which error of refraction, chiefly astigmatic, more often though not necessarily of a hyperopic character, is an exciting factor, acting upon a general run-down system, fatigue, overwork, and a highly nervous organization, under bad hygienic conditions, such as faulty illumination, there is chorioretinitis more or less severe, and a sufficient disturbance of circulation to produce an imbalance between the inflowing blood and lymph and the drainage from the eye.

It is a well known fact that migraine headaches almost invariably follow intense effort in which the eyes as well as the brain play a part. It is not so well understood that shocks of all sorts bring on exacerbations of migraine headache in the same way as that in which acute inflammatory glaucoma is brought on. Sudden shock, such as the death of a member of the family, near and dear to the individual, or some accident followed by anxiety and worry, or even the mere sight of an accident by the individual, may precipitate an attack.

Let us look for a moment at several points of similarity between migraine and glaucoma. First, the fact that both are inclined to occur in families, as in the case of parent and child, and among those whose physical characteristics are similar, such as the color and general appearance of the eyes; and to carry the point farther, I have analyzed the refractive error in certain families, and found that in some instances the amount as well as the kind of refractive error was the same. In many other instances they were similar in kind if not exactly alike in amount. To carry the point beyond this, I may say that in one family in particular the symptoms have been similar in six boys out of seven (the family is one of eleven boys, seven of whom I have examined). The seventh had myopia in one eye with mixed astigmatism in the other; all the other boys had hyperopic astigmatism.

Another point of similarity is the fact that in my observation gouty subjects are more inclined to migraine and to glaucoma than are other persons. One of our French confrères has stated that migraine and gout are sisters. I am sure we all remember the great stress laid upon gout as a

cause of glaucoma. For years it has been a matter of belief, and great attention has been directed toward the correction of gastrointestinal conditions in migraine and in glaucoma.

In regard to the field of vision, I may say that I have nothing accurate to offer as to the similarity of changes in the field, and this perhaps is the greatest objection to my proposition that migraine is a forerunner of glaucoma. I ask you, however, to consider two points: one that there is at least in each case a disturbance of the retinal elements, transient, as I take it, in migraine, a little more permanent in prodromal glaucoma, which seems to me to show the probability of the first being in the irritative stage; the second, in the stage of beginning degeneration. I have tried to get the fields roughly. I have not attempted to get the fields accurately, in view of the great difficulty of obtaining any correct information from patients suffering with migraine, especially those patients in whom there is scintillating scotoma or photophobia to a marked degree.

Some of the French writers who have studied the subject of migraine go so far as to record the presence of changes in the iris. This has been denied by other observers. Piorry many years ago precipitated a discussion which lasted over a number of years, by insisting that overstrain of the iris and overstrain of the retina were responsible for migraine. His theory has, however, never been accepted.

I am going to record the fact that on close observation of cases of migraine I have been able to ascertain on which side the pain was in the habit of occurring by observing that the pupil of that side was more dilated and the anterior chamber was shallow as compared with that of the other eye. There was also a slight difference in the color of the iris—i. e., in the clearness of the color: and in addition, what is more significant, it seems to me, a definite though slight ciliary congestion, the difference brought out under the Zeiss loupe.

Time will not permit me to go as thoroughly as I could wish into the various reasons that I have for my belief, and I must content myself with asking you to see the following picture of a migrainous eye as I have seen it. I think many of the symptoms would easily explain my position: First, the tendency towards from one to two millimeters of exophthalmos as measured by the Hertel instrument; second, the slightly dilated

pupil with the slightly shallow anterior chamber, slight ciliary congestion, increase of tension, pain radiating to back of neck and shoulder, nausea, sometimes vomiting and scintillating scotoma. On ophthalmoscopic examination choriorretinitis is more marked in the migrainous eye, usually more marked in the central region, which would account for the sudden blindness or obscuration of vision occurring in these attacks, also for the photophobia. All this complex is relieved by one or two drops of eserine salicylate or sulphate, one-half grain to the ounce solution. It is a well known fact that migraine has been relieved by pilocarpine, either as a diaphoretic or by local use alone, just as cases of prodromal glaucoma for many years have been controlled by myotic treatment.

It was about five years ago that I began taking interest in this subject. My case records run into the hundreds, and it would require a separate paper to tabulate them for the various case symptoms and treatment before drawing any conclusion. If you will bear with me for a little while I should like to cite a few cases showing typical migraine and indicate their treatment as outlined and the results obtained. I will try to do this as briefly as possible. I select a few cases, neither the worst nor the mildest. (I remember one of my cases in which the disease had lasted for over twenty-five years.) Another fact which may be of interest is that some of my cases have been to as many as six or seven oculists; had glasses refitted on many occasions without relief. In many of the cases I made no attempt to change glasses, in order that I might prove to the patients that the trouble never had been so much a matter of glasses as a condition of the eyeball, which had been overlooked.

The first case to which I wish to refer is that of A. L. H., married, architect, age forty-one years; came to me September 5, 1911; had had pain in eyes, head and neck whenever using his eyes for work any length of time. The trouble dated back twenty years. This patient's astigmatism was only $+0.25$, at 80° in the right and 100° in the left, together with a little hyperopia, greater in the left eye. For four years this patient had gone to bed about once a month for a period of three or four days with typical symptoms of migraine, including the vomiting, and when he came to me he said the

attacks had become more frequent, and he wanted to know if his eyes had anything to do with them. I fitted him with glasses, under hyoscin and homatropin, treated him at home with a mixture of pilocarpin one grain, dionin twenty grains to the ounce of water, to be used one drop in each eye three times a day, together with mercurial friction to the temples, ten per cent, at bedtime, and syrup of hydriodic acid internally. These medicines were given because of the increased tension of the left eye and chorioretinitis. He was kept under observation one or two months, and then once a month until December 4, 1913, when the tension was found to be fifteen millimeters in the left eye, which was the migrainous eye. He has not been seen in the office since November 30, 1914, but I have an intimate acquaintanceship with him and meet him from time to time. Whenever he is conscious of the slightest strain of the eyes from overwork he uses his drops, takes one-half or one hour's rest and goes ahead with his work. There was no disease of an organic nature, the man's health was practically perfect, he leads an active, industrious, sober life, and always has done so. He is of a highly sensitive nature, yet shows no morbidness.

The second case is Mrs. S. W. McC., aged thirty-eight years, married, had had dizziness and blind spells over one-half the field, and biliousness for ten years. Came to me November 1, 1910, wearing a spherical $+0.75$ prescribed by one of our leading oculists. I found that the best glass to give her was $+0.75$ with $+0.50$ cyl. ax. 180° in each eye. I got in this case a history of menorrhagia. There was mild chorioretinitis, and in view of the fact that she lived in the country, and her general practitioner had been unable to control the hemorrhagic tendency, I did two things: first, tried to stop the overabundant flow with fluid extract of hydrastis, thirty drop doses, in the beginning every three hours, later three times a day and then twice, and finally once a day; the other was to better the blood condition and try to offset the nervous waste by a mixture of red bone marrow and lecithol, together with the pilocarpin, dionin and mercurial friction. (Vide supra.) I have seen her occasionally, about every three or four months, ever since. The patient was about as nervous as any patient I have ever seen; she was also in a very much run-down physical condition, with a slight esoph-

ria for distance and exophoria for near. Her tension was slightly up in each eye. Since I have undertaken her case she has lost her father, and yet she has never had any severe attack. I may say that at the end of six weeks after beginning treatment she rode horseback in a show and took the jumps.

The third case, W. W. E., aged forty-one years, married, railroad superintendent, attacks extending over a period of twenty years. Came to me July 10, 1913; had good vision for distance, complete history of migraine, worse on left side. Hertel exophthalmometer, O. D. 24, O. S. 25; intertemporal, 114. Hyoscin and homatropin refraction; patient was given for distance, right eye $+0.25$ sph. with a $+0.25$ cyl. ax. 90° , left eye $+0.50$, sph.; added $+0.50$ for near glasses. Tension twenty-two right eye, twenty-eight left. Have seen this patient at intervals of four months or more ever since. He was put upon the same mixture of pilocarpin and dionin with mercurial friction; internally was given Donovan's solution. He had marked chorioretinitis in each eye, worse in the left, and blepharitis marginalis in each, worse in the left eye.

The fourth case, E. M. D., age twenty-three years, unmarried, came to me February 1, 1913, wearing $+3.0$ cyl. ax. 120° O. D. and $+3.0$ cyl. ax. 60° , O. S. Slight exophthalmos in the left, tension up in the left; hyoscin, homatropin examination, and prescription given her for $+2.25$ cyl. ax. 105° O. D., $+3.50$ cyl. ax. 75° O. S.; she was put on pilocarpin, dionin and mercurial friction and syrup of hydriodic acid. She was quite well from June, 1913, until March, 1915, when because of the death of her grandfather she had another attack. This, however, responded to a few treatments, in the office, with eserine and dionin powder together with the resumption of home treatment. She had had this trouble for more than twelve years.

The next case is of interest from two points: first, he is a physician; second, he is a myope. V. D., age thirty-three years, married, came to me November 11, 1911. Had worn glasses for twenty-two years, prescribed by several of the very best oculists in the country; had been for eighteen months in the care of an excellent oculist, who had been giving him prism exercises and a prism to be worn in his

prescription glasses. Had had almost constant attacks for the last six or eight months. Tension up in each eye, chorio-retinitis in each, worse in the left, slight exophthalmos in the left. For distance there was no imbalance, there was an exophoria of six for near. Had been wearing — 0.88 combined with — 0.25 cyl. ax. 90° O. D., — 1.50 combined with — 0.50 cyl. ax. 90° O. S. Examination under hyoscin and homatropin; and prescribed for distance — 0.62 with — 0.88 cyl. ax. 85° O. D., — 1.50 combined with — 0.50 cyl. ax. 85° O. S. For near I gave him a — 0.88 cyl. ax. 85° O. D., — 0.88, combined with — 0.50 cyl. ax. 85° O. S. He was given pilocarpin, dionin and mercurial friction; nothing internally. I thought he could take care of his own physical condition, which was quite good. He still keeps his drops on hand, and whenever there is a slight suggestion of an ache he uses them. Only three or four times within the four years have I had occasion to supplement his treatment by any local treatment in the office. Whether justly or not, he has condemned the oculist who had him using prism exercises at home and in the oculist's office for a period of eighteen months, without any relief, but with increasing discomfort. However, I may say he has been a staunch supporter of mine since the day when he first received relief from the headaches which were materially interfering with his work.

The pain radiating into the shoulder has been common to these cases. I may say here that in each of my cases where this symptom complex has been found I have prescribed for distance colored glasses, Hallauer 64, and in some cases 67, some cases only 63 or 62, and in a few I have prescribed two pairs of Hallauer together with a plain pair for indoors; the deeper shade for outdoors, the medium shade for ordinary lights on dull days and the plain glasses for indoors when the electric lights were not turned on. My idea in this was of course to protect the retina against the disintegrating effect of light until the pigment layer became normal.

I believe that I have given enough cases to illustrate some of the points of similarity between the migrainous eye and the prodromal stage of glaucoma. I have not given any of the histories of the cases in which I found it necessary to operate for glaucoma and which originally attracted my attention to the possibility of migraine being a forerunner of glau-

coma. Time does not permit of any further discussion of the subject and perhaps I have already occupied a good deal of the time of the meeting.

I believe I have ample proof to uphold my position, and I bring the subject before you for criticism and whatever information there may be contained in my paper, and for your cooperation in working out the truth or fallacy of the proposition. For myself I may say that after five years' work, with the relative cure in all cases, and absolute cure in a few, for those painful migraine headaches, I am convinced. There are many angles from which this subject has been viewed, including in some cases the relationship of the migraine headache to other conditions of the general system, such as thyroid hypersecretion, deficient adrenalin chlorid secretion and blood pressure, and so forth; and there has been no time to bring these matters before you, yet I assure you that they have been given due consideration in connection with the subject. I wish to express my thanks for the opportunity to come before you with this matter, and finally, to hope that it may lead to the alleviation of a great deal of suffering, anxiety and apprehension on the part of our patients, and redound to the credit of oculists everywhere.

XXXIII.

HERPES ZOSTER OPHTHALMICUS.

BURTON CHANCE, M. D.,

PHILADELPHIA.

The decided rarity of the occurrence of ophthalmic shingles is offset by a comparatively voluminous literature treating on the various aspects of the disease; and cases exhibiting unusual manifestations are still being reported from time to time. It has been my good fortune to have had, since 1908, the care of, or opportunity for the close observation of, six cases of zoster in various stages, presenting unusual as well as the usual characteristics of the disease. I venture to give here the outlines of the clinical histories of these six cases and to utilize these lines as a framework upon which to build a treatise in which there shall be presented the salient facts and a summary review of the subject of herpes zoster ophthalmicus.

My communication will not be burdened with bibliographic references, because what I shall give is a résumé of the accepted facts, and for obvious reasons my quotations are given for the most part without acknowledgment. Those who desire lists of references, I would recommend to consult Hutchinson's papers, Wilbrand and Sängner's "Neurologie des Auges," Parson's "Pathology of the Eye," the Ophthalmic Year Books, Head and Campbell, in "Brain" for 1900, and Head's article in "Allbutt's System of Medicine."

Case 1.—Zoster of nose, cheek and brow, late involvement of cornea, with oculomotor paresis. (This case was published in detail in *ANNALS OF OPHTHALMOLOGY*, 1908, volume 18, page 221.) A lady of seventy years, early in April, 1908, was seized with dull pain in the left side of her face, which continued for two days, when it was suddenly relieved by an eruption of herpetic vesicles on her nose, cheek and brow, preceded by deep redness over the areas subsequently vesiculated. Several days later the eyeball became tender and painful, and

on the seventeenth day after the first symptoms diplopia was noticed.

The features were bloated and brawny, and the surface covered with vesicles in various stages, from blebs to crusts, the most severe lesions being on the side of the nose. There were ptosis and an outward and downward deviation of the left globe. The conjunctiva was injected, the discharge viscid, the cornea edematous and insensitive, and although it was not congested, the iris was sluggish, the pupil dilated. Tension increased, suggesting glaucoma.

At the end of a week the vesicles had dried, but the tissues continued brawny. There was headache, but less ocular pain. Inward and upward rotations were abolished. A flattened vesicle was seen on the sclera near the limbus. The cornea was insensitive, and it had become infiltrated in the center at the site of what appeared to have been a ruptured vesicle. The corneal symptoms subsided by the end of the fifth or sixth day. The movements of both globes were much affected, yet the amplitude had increased somewhat. At the end of three weeks ocular balance returned and the cornea regained its sensitiveness. By the middle of June healthy restoration was complete, with faint dermal scarring.

Case 2.—Zoster of brow and nose; involvement of cornea; anesthesia dolorosa; relief, with leucoma.

Vigorous man of fifty-two years, consulted me in August, 1911, four months after attack of zoster which had involved the right side of forehead and nose to the tip, with early invasion of globe. Came for possible restoration of sight, which had been reduced to shadows by reason of dense vascular nebulae in lower half of cornea; with iris adhesions. Persistent lachrymation, with pains in the eye, and "anesthesia dolorosa" over forehead and scalp to the interparietal line; he was compelled to go bareheaded, as the pressure of his hat caused excruciating pain. Deep pits, with "keloid" scarring, over nose and forehead. Corneal surface macerated and permeable to fluorescin. Three months later no pain in globe, skin less painful, corneal surface healed, with dense leucoma.

Case 3.—(Included by the kindness of Dr. Schwenk.) A negro. Zoster of supraorbital and nasal; oculomotor symptoms; infiltration of substance of cornea; recurring phlyctenules at limbus, later ulceration, with staphyloma, and finally enucleation.

Well developed North Carolina negro, aged twenty-six years; came to Wills Hospital on July 2, 1912, four weeks after attack which had affected right forehead and nose. Exhibited deep, recent pits on forehead, bridge, side and ala of the nose, and one deep pit at inner third of lower lid. None on cheeks nor in the scalp; deepest scars clustered about points of exit of nerves. Eye closed, but lid could be raised slightly by frontalis. Marked tarsal and conjunctival edema. Globe rotated out and down; upward rotation hindered. Copious lacrimation. Numerous deep spots of infiltration in cornea, without ulceration or iridocyclitic symptoms. Pupil widely and freely dilated, as though from the use of a mydriatic solution. High degree of myopia, with changes confined to nasal side of disc.

Symptoms continued for several weeks, with recurring crops of limbal phlyctenulæ. Man became weary and disappeared, but returned a year later with corneal staphyloma. Globe was excised by another surgeon, in January, 1915.

Case 4.—Zoster of supraorbital with involvement of cornea and iris. Synechiæ and leucoma.

A man of fifty-seven years consulted me in April, 1914, because of inflamed right eye and loss of sight, which ensued after an attack of "blisters" on forehead in February. Deep herpetic scars in line of supraorbital nerve. None on cheek or nose. Cornea eroded at summit; irregular pupil due to posterior synechia; erosion persisted intractably until August, when gradually the epithelium was restored and an opaque leucoma resulted.

Case 5.—Zoster of supraorbital. Complete recovery. Lady of sixty-five years, attacked early in April, 1914, consulted me at the end of the tenth day. Crusts, scantily, on right brow and forehead, with a few small ones at inner angle over lacrimal and nasal, and into the hairy scalp. Complete recovery at the end of the fifth week, with faint scarring.

Case 6.—Included by the kindness of Dr. Schwenk, in whose service at the Wills Hospital the patient, a man aged forty-two years, applied for treatment of inflamed left eye, March 14, 1914. In passing, it may be of interest to note that this is the only case of zoster ophthalmicus registered at the hospital among the 14,899 cases of disease treated there in 1914.

The left lids, cheek and brow had been swollen and red for ten days, and the lids were found to be edematous. The

erythema was intense. A tentative diagnosis of erysipelas was made, and the man was instructed to apply a saturated solution of magnesium sulphat. He did not return for two weeks, because he had been too ill to come, and had been in bed for ten days. He regarded his disease as erysipelas and had applied domestic salves, which had been allowed to form a caked mass on his lids and brow. Underneath this mass were found drying and dried scabs. At the end of another ten days the brow was quite clean, but lines of pit-like scars were seen leading up from the supraorbital notch over the forehead, justifying a revision of the diagnosis to "shingles."

Herpes zoster ophthalmicus, or zona ophthalmica, commonly called shingles, is an acute, specific disease of the nervous system characterized by an eruption of vesicles, upon inflamed bases, over the area supplied by branches of the ophthalmic, or first division of the trigeminal nerve. The branches usually affected are the supraorbital, supratrochlear and lacrimal, and less frequently the nasal. The inflammation, which arises without any obvious peripheral or central cause, is located in either the trunk of the nerve itself or in the Gasserian ganglion, or in both nerve and ganglion.

It was pointed out by Jonathan Hutchinson, in his clinical report on "Shingles Affecting the Forehead and Nose" (Royal Lon. Oph. Hosp. Reports, Vol. 191, 1866), that "if the skin of the nose be extensively affected by herpes there is a special risk of the iris and cornea also becoming inflamed." This association has since been confirmed by many observers; indeed, it was at one time believed to be the invariable rule that when the skin of the nose was affected the ocular structures also were sooner or later involved. Yet, in several cases where vesicles have covered the side of the nose the eye itself has wholly escaped; Hyberd found that in fifty-eight cases in which the nose was affected, thirty-five showed eye changes, whilst in eighteen cases the cornea and iris were normal.

It should be noted the affection has been known to ophthalmic surgeons as a distinct disease only since the latter half of the nineteenth century, and that many practitioners have never seen a case. It is, indeed, an uncommon disease, notwithstanding that it has been said to have shown a tendency to epidemic outbreaks. In twenty years of private practice,

if I may be permitted to speak of my own experience, I have had the care of only four persons afflicted with it, and amongst 30,477 cases of all forms of diseases of the eye that came to the clinics of the Wills Hospital in the years of 1913 and 1914, only five were cases of zoster ophthalmicus. In Greenough's series, intercostal herpes was fourteen times as frequent as the facial varieties; and in herpes of the face, out of a total of one hundred and sixty cases, only sixteen showed affection of the lids. Knowles' record of general herpes zoster, in 31,337 cases of diseases of the skin, seen in a period extending over nine years, shows how infrequent ophthalmic zoster is in dermatologic practice, for out of his total number of two hundred and eighty-six cases, only five occurred involving the supraorbital region, and only two of these showed affection of the cornea.

Zoster is a mysterious disease; we are still in doubt as to the cause of the neuritis, and equally uncertain whether it be central or peripheral in origin. Whatever the poison may be, the reactions of its manifestations are those of an acute specific infection, the clinical facts of which are not militated against by another fact equally well settled, that various kinds of nerve poisons may set up similar inflammations, if they do not actually produce the eruption of zoster.

A certain number of cases of zoster ophthalmicus seem to bear a distinct relation to or association with diseases of the general nervous system, for zoster has been noticed in the course of the general paralysis of the insane, and it frequently accompanies certain of the acute infectious diseases, notably pneumonia. Notwithstanding this comparative frequency, in the majority of cases the cause of its outbreak is not known. In some cases zoster has been seen to develop as the result of chilling of the body; Stieren was able in his cases to trace a history of exposure to cold or dampness in those who had become exhausted by unusual exertion and fatigue, in persons of sedentary habits. "Taking cold," however, is in itself a vague term, but since it has become possible to explore the sinuses of the skull adjacent to and communicating with the nasal passages, we have learned that many cases of "cold" are really expressions of inflammatory states within those sinuses. While I have no data at hand to justify such an assumption, I have entertained the belief that time will show

us that disease of the sinuses bear a close relation to outbursts of ophthalmic herpes—if not as the basic cause, at least as a contributory. While it may be accepted as true that the exit of nerve branches from bony foramina renders them subject to the effects of exposure, and, as we will see further on, that it is at these sites that we note painful neuralgias, both during the course of the disease and among the sequels of it, may it not be conceived that filaments of the nerves supplying the sinuses have been affected in their passage through the sinuses and that they thus transmit infections to the nerve branch?

In other cases it has been said to arise after injuries to the head, as by a blow on the cheek or eyelid; in others by poisoning by coal gas; in certain others after the toxic use of arsenic, which, however, according to Head, can be but a remote cause, and only insofar as it renders the patient susceptible to attack. Severe mental emotion has appeared to be the exciting cause in a good many cases, yet there is scarcely any proof that emotion can produce it. Besnier, according to Crocker, relates the case of a student who, while studying a case of ophthalmic herpes, was himself seized, and permanent facial paralysis ensued! Other cases have preceded, accompanied or followed attacks of influenza, the consideration of which affection, however, can hardly be dissociated from the study of the acute inflammations of the nasal sinuses.

Earlier writers ascribed zoster to the effects of rheumatism, while later observers believed zoster to be dependent upon intestinal toxemia, to diabetes; and it has been seen during the course of nephritis. It can thus be seen that zoster ophthalmicus does not arise spontaneously in presumably perfectly healthy individuals, but rather it attacks those who have been weakened by some preexisting disease. In my own examples no definite cause had been assigned in any case. Sattler regarded certain reported cases accompanied by pareses to be not true types of spontaneous zoster, but, on the contrary, believed them to be dependent upon lesions or growths about the base of the skull. This supposition strengthens my own belief that a study of the condition of the cranial cavities will throw a very strong light upon the origin of ophthalmic zoster. The value of a knowledge of the condition of the nasal sinuses as a safeguard for the maintenance of the good health is now fully appreciated.

The studies of Head and Campbell were carried on in county asylums, and the majority of their patients suffered from general paralysis. They were not able to decide whether the zoster was symptomatic, or whether the debilitated condition of such patients rendered them prone to attacks. In the best of circumstances, the physical condition of the inmates of county asylums is indeed bad, and it is not always possible to attend to the carious teeth or to prevent oral sepsis among such patients, two conditions from which infection can extend not only to the cranial cavities, but enter the general system as well.

While it has been said that sex does not have any special influence on general zoster, ophthalmic zoster occurs in both sexes with equal frequency; yet in Hutchinson's cases, males were more often attacked than females, for eleven were males and seven females. In my own observation of six cases, four occurred in men.

Ophthalmic zoster occurs at any age, but it is more commonly seen among the elderly in feeble health than among robust adults and young children; yet the young presenting no constitutional depression may be attacked. MacNab had a case in a boy of six; Rachmaninow also reports a case in a young child, and Knowles noted a case of corneal involvement in a girl of four. In Hutchinson's series the average age of eighteen cases was forty-seven years, while in the six cases here reported the average was fifty-two years.

There seems to be no special racial predilection to the incidence of ophthalmic herpes. All of my cases were in native born Americans, of which the most disastrous occurred in a negro, a race seldom affected, as Knowles saw but twelve instances of general zoster in the negro.

Many attempts have been made to prove that zoster ophthalmicus occurs more frequently at one season of the year than at another, but results are conflicting, although my own six cases were affected in the spring or early summer. The probability of the idea that it is dependent upon atmospheric influences is favored, it may be, by the frequent occurrences of cases in groups.

As the trigeminal is the nerve in whose territory this affection occurs, the vesicles more frequently occupy the region of the distribution of the first or ophthalmic branch of that

nerve. The eruption, therefore, is confined to the forehead, the anterior part of the scalp, the eyelids, and the side of the nose. It may be confined to only certain branches of the ophthalmic nerve, as shown in a case by MacNab, in which the vesicles were limited to the middle of the nose, from the tip to the level of the eyebrow above, and laterally the margins of the eruption projected out on the cheek.

It is a characteristic feature of the exanthem that it is almost always confined to one side of the face and head, and that the affection of the skin is sharply limited at the middle line. The disease is rarely bilateral; Hutchinson believed it never to be so. He found the right side affected in five cases and the left in nine. In all of his cases the tract supplied by the frontal nerve, that is the forehead and front part of the scalp, were affected, and in eight the side of the nose was inflamed, and in six of these the cornea and iris were involved. In none of his cases in which the frontal nerve alone was involved was the eye inflamed, whilst the eye suffered in all in which the nasociliary branch was implicated, but in none in which the nasal branch was not involved was the eye inflamed. This dictum cannot be taken as a law, however, because the globe was not always affected when the nasociliary branch was involved. In one of Hutchinson's cases there was zoster on the chest, and Knowles' list includes a case with eruption on the mucous surfaces of the lips as well as in the supraorbital region.

The vesicles, then, are found upon the upper lid, upon the forehead as far as the scalp, and on the nose. When the district supplied by the second branch of the trigeminal is affected, the vesicles are situated upon the lower lid, over the region of the malar bone. Sometimes the terminal expansions of both branches are affected simultaneously; in the case of the negro in my series the lower lid was quite deeply pitted. It is extremely rare for the regions supplied by the second and third branches to be involved. Head saw a case of typical zoster ophthalmicus associated with an equally well marked eruption over the area of the second division (infraorbital) of the trigeminal. His table of four hundred and sixteen cases of zoster shows the trigeminal to have been affected in all three branches on the right side, including the lids, cheek, upper lip, the mucous membrane of the cheek, the tongue and the tonsil.

The attack may be preceded by a prodromal stage of varying length, during which the temperature is raised and the patient has the sense of an impending illness; very much as in the manner of the invasion by one of the acute infections. There is usually violent neuralgia, the pains being of either a darting or boring character, over the supraorbital region, in the course of the trigeminal, or it is manifested by hemicrania and by pains in the scalp. When there is great soreness of the scalp the hair may fall out. The surface of these hyperalgesic areas may become reddened and be more or less edematous, and if the case is seen before the rash appears, it is sometimes possible to map out the area to be subsequently occupied by the eruption by means of these painful areas. In a few cases neuralgic symptoms may be entirely wanting. In some cases there may be a slight conjunctivitis for two or three days. These symptoms may endure with varying intensity for ten days, although it is most usual for them to exist for only a day or two. When the prodromal symptoms are severe they are followed on the third or fourth day by a sudden eruption of vesicles. The patient may become quite ill, especially when the extent of the eruption is wide and the evolution rapid, and, along with moderate fever and faintness, he may be seized with nausea and vomiting which persist until the eruption has fully appeared; but when the efflorescence is complete the pain lessens and the general symptoms soon disappear. The temperature of the affected parts is decidedly increased, but commonly the sensibility is diminished. The manner of such severe attacks not unreasonably may be compared to that of an attack of pneumonia. The inflammation is marked by a sudden onset, but it shows no tendency to spread beyond what may be present at the first outburst; therefore, as much as is to be affected presents the signs at once. If the eye is involved at all, it will be affected at about the time of the appearance of the vesicles on the skin.

Among the ophthalmic lesions accompanying herpes zoster there may be swelling with, perhaps, vesication of the conjunctiva; the formation of vesicles on the cornea, which usually lead to ulceration and keratoiritis, but in which hypopyon rarely develops. All of the ocular structures may be involved, although the external muscles, the conjunctiva and cornea are the parts most frequently affected. The eyelids during the

active stage are nearly always congested and edematous; in mild cases there may be merely irritability and photophobia, with slight congestion, yet in more than half the cases lesions of the globe occur, although the deeper structures are only occasionally involved. Lacrimation with tenderness over the lacrimal gland may be observed, and, early in the disease, the adjacent glands sometimes enlarge and frequently are found to be tender.

The ocular complications do not, as a rule, set in until the eruption is at the height, or when it is already beginning to decline. They may be present, however, early in the attack, appearing primarily in the cornea at the same time as the vesicles on the skin, as was noted in Haab's case; indeed, ulceration of the cornea has been found within the first week. It may, however, happen, when there is much scabbing or an eczematous condition of the eyelids, that the conjunctiva becomes inflamed some days or weeks after the onset of the skin trouble.

Great edema of the lids and chemosis of the conjunctiva may be present when the supraorbital is densely affected, and one of the earliest signs, in cases in which the cornea becomes involved, may be an irritability of the conjunctiva for three or four days preceding the outburst of the vesicles.

Vesicles may be found on the conjunctiva, especially when the nasal branches of the nerve have been affected, and, after a day or so, the cornea itself may be invaded.

As has already been pointed out, the most serious and the most frequent of all the ocular manifestations is the eruption of vesicles on the surface of the cornea. Such an eruption is usually preceded by a period of insensitiveness of the cornea to touch. This quite pronounced and conspicuous symptom may be the only symptom observed; it may extend so far as to amount to the total abolition of the sensibility of the cornea. In other cases the corneal substance itself may be invaded, although when it is the course of the invasion shows nothing characteristic of zona, but resembles the characteristics of herpes febrilis—with this difference, however, that the acute vesicular form is less often seen in zona than in herpes febrilis. In herpes ophthalmicus the vesicles are arranged in groups and speedily rupture, thus exposing minute ulcerations which form, enlarge, and become fused with one an-

other, whereby, in a short time, a considerable area of the cornea may become denuded of its epithelium, and as the area expands the border of the denudation becomes crenated. Usually the area remains shallow, yet it may penetrate deeper and become invaded by purulent infiltration, and, if perforation occurs, the iris prolapses with all the consequences following such a complication. In other cases a typical dendritic ulcer forms, in which, in one or more directions from the minute ulcer, gray striæ extend, growing longer and longer, throwing out lateral branches until finally the surface of the cornea breaks down, although such ulcers are commonly only superficial and never penetrate deeper unless they have become infected, in which case hypopyon usually results. Dendritic ulcers are extremely chronic and prone to relapse, and in the majority of cases of zoster they seem to arise more deeply than in the case of herpes febrilis.

Much more frequently, too, than in febrile herpes, the vesicles of zoster are accompanied by deep infiltration of the cornea, yet infiltration may occur without ulceration; and in zoster, herpes, too, is more likely to be complicated with iritis, which complications may not easily be observed because of the blepharospasm, the pain and the irritation, which may hinder if they do not prevent a close examination, whereby a single bleb on the cornea may be overlooked and the process not detected until serious damage has occurred. In some cases, as in the first of my series, the anesthesia may affect only circumscribed areas, and, when it is easy to make a thorough examination, small round dots may be detected, which dots are likely to be followed by ulcerations; or, more happily, as was shown in my case, they may disappear without breaking down. Haab believes such opaque spots are dependent upon anesthesia or disease of the trifacial. It is still open to question whether or not true interstitial changes can occur without there having been a loss of the superficial surface. Such cases as have been reported have been described as having been manifested at an advanced stage of the cutaneous affection. Terson, however, has reported a case in which the corneal infiltration preceded the cutaneous eruption fully two weeks, in which, as the epithelium was not affected, complete recovery followed. Sometimes a regular keratitis profunda develops, when, as might be expected, it takes a longer time

for the opacities to disappear, if, indeed, they ever disappear at all.

It has been noted frequently, as in a case of my own, that the pupil becomes dilated and the iris immobile, failing to contract to light and to accommodation; and, quite early, the iris has become hyperemic, even though there may not have been serious involvement of the cornea. But the iris may be affected by a true infiltration of lymph, which binds the pupil by posterior synechiæ, and there may be a filling in of the pupillary space by a plastic exudation. Hutchinson believed that in all cases in which the eye was affected, paresis of the iris took place so that immobility of the pupil ensued. Such symptoms have been seen when the trochlear nerve has been affected; they are produced, perhaps, by the ophthalmic ganglion becoming disturbed through irritation from the ophthalmic nerve. So early an observer as Hebra noted that the mobility of the iris may be so much impaired as to simulate iritis. This would make the diagnosis particularly confusing when it occurs in those cases in which, along with the early symptoms, there has been hyperemia of the conjunctiva also.

It may be seen, therefore, that iritis does occur with keratitis, which is contrary to what is the case in febrile herpes. The iritis may be quite severe, and it may extend to the ciliary body and be accompanied by the presence of precipitates in the aqueous. In numerous cases iritis has not arisen until late; in such instances, without doubt, it has been dependent upon a general systemic toxemia.

Diffuse retinal hemorrhages have been noted in zoster ophthalmicus, and retinal degeneration, too, has been said to follow an attack; yet such statements are not incontestable, because it is not quite clear how such effects can arise. So also is it likewise extremely difficult to say with certainty that retinitis, choroiditis, and optic neuritis with consequent atrophy, in given cases, were brought about by the effects of zoster, and were not present prior to the attack. Head states that he examined every case of ophthalmic zoster that came under his notice, and that even in the most severe cases of the disease he had never seen changes in the retina or optic nerve.

The intraocular tension is not infrequently lowered while the inflammation is recent—indeed, it is commonly stated as

characteristic that the intraocular pressure becomes decreased; yet in other cases, as in the first of my series, increase of tension has been observed to set in; while Bradburne reported a case of zoster which was ushered in by an attack of glaucoma, but in which the tension fell below normal later in the attack.

For many years it was a much debated question as to whether or not ophthalmic zoster is ever complicated by lesions of the oculomotor nerves, but in the past twenty years cases have been reported so frequently that we now know that it is, though rarely, accompanied or followed by paralysis of one or more of the ocular muscles, which paralysis may persist long after the cutaneous symptoms have disappeared. Of the one hundred and fifty-eight cases of ocular paralyses of various kinds associated with ophthalmic zoster, collected by Hunt, eighteen cases involved the third nerve, one the fourth, and five the sixth nerve. His results may be accepted as typical, and, therefore, it is accepted as true that the third nerve, in one or more of its branches, is the nerve most frequently affected, the next in order being the sixth, while the fourth is very exceptionally involved, although Traquair cites four cases and reports another under his own observation. Harlan described a case exciting paralysis of all the external muscles supplied by the third nerve, yet without myosis. Silcock had two cases of complete ophthalmoplegia, externa and interna. Paralytic symptoms may involve the whole third nerve or produce separate symptoms like ptosis or mydriasis, and there may be also distinct ptosis when the trochlear is affected. In the first case of my own, in which there was paresis of the third nerve, there was undoubtedly disturbance of the trochlear muscles as well. Exact measurements of muscular defects, however, are most difficult to make.

It is an interesting fact that paralysis of the facial nerve, on the same side, may follow or accompany herpes facialis in the distribution of the fifth nerve. Rare though this complication is, several carefully recorded cases prove its occurrence beyond question. These palsies have shown a slow but complete recovery, as a rule. The close proximity of the nuclei of origin of the fifth and seventh nerves in the floor of the fourth ventricle, suggests a method of extension of inflammation which would account for these curious and rare cases of oculomotor and facial paralyses.

Beauvois has reported a case of paralysis of the sixth nerve, which occurred in an aged woman. The prodromal symptoms had been quite severe and the paresis, a most rare affection, persisted for six months, fading at the patient's complete recovery. Galizowski tells of another case in a man of eighty-two years, who, after an attack of pneumonia, was seized with a very extensive eruption on the face which invaded the cornea. After a year the paresis disappeared, but Galizowski ascribed the paresis to the effects of the pneumococcic infection. Gasper cites a case of complete paralysis of the fourth nerve, together with total paralysis of the facial on the other side; and Galizowski reports a case of paralysis of several muscles of the eye innervated by different nerves. This case is interesting from an association of pareses of the sixth nerve and an internal ophthalmoplegia. Communications between the ophthalmic and the motor nerves have been described. Such combined affections are not difficult of explanation, for the sixth nerve passes quite close to the ophthalmic, and as the intrinsic musculature is innervated by the oculomotor through the intervention of the ciliary ganglion, which receives the sensory root from the nasal, a branch of the ophthalmic, the connection may readily be seen.

It may be well for us to recall the anatomic arrangement and distribution of the ophthalmic branch of the fifth or trifacial nerve. The trifacial, according to Leidy, resembles the spinal nerves in that it has a motor and a sensory root. The sensory or larger root is provided with a ganglion, the semilunar, or Gasserian ganglion, which the nerve enters on its upper border. From the anterior border are given off three nerves, the smallest of which is the ophthalmic nerve, which proceed forward through the sphenoidal foramen into the orbit. This nerve, together with the superior maxillary nerve, the next in size, is a purely sensory nerve.

In its course from the cavernous sinus to the sphenoidal foramen the ophthalmic is in company with the third and fourth nerves. At the foramen it divides into three branches, the lacrimal, the frontal and the nasal nerves. After leaving the ganglion it gives off a small recurrent branch to the tentorium, and in its further course it is connected by filaments with the third, fourth and sixth nerves, and with the cavernous plexus of the sympathetic.

The lacrimal nerve runs along the outer part of the orbit above the external rectus muscle to the lacrimal gland and upper eyelid, to which it is distributed. The frontal nerve runs along the root of the orbit above the palpebral elevator and divides into the supratrochlear and the supraorbital nerves. The supratrochlear leaves the orbit external to the pulley of the trochlear muscle and ascends to the forehead close to the bone. It supplies the skin and conjunctiva of the upper eyelid and the skin of the forehead. The supraorbital, the main branch of the frontal, passes from the orbit through the supraorbital foramen and is distributed by two branches to the skin of the forehead and the upper part of the scalp. The nasal nerve enters the orbit in close association with the external rectus muscle and the third nerve. A branch re-enters the cranial cavity and is then distributed to the nasal cavity by the cribriform plate of the ethmoid. Its internal branch is distributed to the mucous membrane; the external branch also supplies the mucous membrane, but leaves the cavity between the nasal cartilage and the nasal bone to be distributed to the skin of the tip and wing of the nose. In its course the nasal nerve gives off a branch to the ophthalmic ganglion, a slender filament running on the outer side of the optic nerve; the large ciliary nerves, which pierce the sclerotic and supply the ciliary muscle and iris; and the infratrochlear nerve which leaves the orbit at the inner angle, and is distributed to the lacrimal sac and caruncle, the conjunctiva, the skin of the eyelids, and the root of the nose.

As has already been pointed out, the territory most frequently affected, to quote Hutchinson, is that of the supra-orbital nerve. and next to it comes the supratrochlear. The frontal is often affected without the supratrochlear, but the latter never suffers alone. Both, too, are often affected without the other branches, but when this occurs the eye is not inflamed.

We have next to consider the lacrimal branch. This branch gives filaments to the lacrimal gland, to the conjunctiva, and, lastly, to the skin of the upper eyelid. It is, therefore, not very easy to tell in any given case of ophthalmic shingles whether or not it is affected; and it is likewise difficult to tell whether or not the lacrimal gland also is inflamed, as both the conjunctiva and the upper eyelid receive branches from other

sources than the lacrimal. In any instance, however, in which the eruption is unusually free on the upper eyelid, and there is great swelling and much conjunctival congestion, we may safely believe that the lacrimal nerve is concerned. The most important of the branches, so far as ophthalmic zoster is concerned, is the nasal nerve, or, as it is better named, the oculo-nasal. This nerve, to repeat what has already been described, soon after leaving the main trunk, gives off the long root of the ciliary ganglion, from which the short ciliary nerves pass to the iris. It next gives off the long ciliary branches which run directly to the ciliary muscle and iris, and, subsequently dividing into two branches, under the names of infratrochlear and external, supplies sensation to the middle and tip of the side of the nose. It follows, then, that to know whether or not the nasal nerve is concerned in an attack of ophthalmic shingles, we must look for vesicles on the side of the nose, especially near to its tip.

The pathology of herpes zoster is of great interest, because for many years it was the subject of conjecture only. Mehlis, in 1818, was the first to suggest that the eruption of herpes zoster follows the distribution of nerves, but it was not until 1861 that von Bärensprung declared it to be definitely of nervous origin. The first case examined postmortem was one occurring in a person who died of tuberculosis, in which von Bärensprung found lesions in the posterior ganglion. Other later observers had opportunities to make postmortem examinations, their findings extending and confirming von Bärensprung's contention. In 1871 Wyss reported a case of zoster of the whole first division of the trigeminal nerve. In this case, death followed a few days after the appearance of the eruption, and the lesion was found confined to the locality of and included the Gasserian ganglion. In 1875, in a case of ophthalmic herpes, Sattler found an inflammatory lesion with hemorrhages destroying both the nerve cells and the fibers of the Gasserian ganglion. The ganglion was filled with round cells and the ganglion cells markedly destroyed, while the ophthalmic division of the nerve was degenerated.

In 1900 Head and Campbell exhaustively investigated the subject of herpes zoster and added twenty-one cases to the list of those already studied by pathologic investigation. Two of their cases showed involvement of the supraorbital; up to

that time there had been but two other well reported autopsies on cases of zoster ophthalmicus, namely, by Wyss and by Sattler.

Head and Campbell's twenty-one cases bore the signs of all stages after the eruption, varying from a few days to one and a half years, and their findings may be accepted as authoritative, their work indeed monumental. In their studies changes in the ganglia of the posterior root, in the posterior nerve root, in the peripheral nerves and in the spinal cord were noted. The cases exhibiting disease in the area of the trigeminal were examined with special care, and as the lesions noted in them could not be interpreted except in the light cast by that obtained from the more general cases, a résumé of their findings will be given.

In the Ganglion of the Posterior Root.—In the stage of active eruption the ganglion was profoundly inflamed and the tissues invaded crowded with small round cells, masses of which were scattered in clumps round the periphery and in the center of the ganglion. These foci were occasionally found around extravasated blood. In other cases the center of the ganglion would be ploughed up by large hemorrhages. The hemorrhages and inflammations were found upon the dorsal aspect of the ganglion in the portion opposed to the anterior root.

The ganglion substance showed signs of destruction to a greater or less extent, but in the center of the hemorrhagic foci the cells were absolutely destroyed. In some cases the nuclei of the ganglion cells were swollen and void of nucleolus. The substance of the cell body was blurred and without structure. The extent to which these changes appeared varied in different cases, and such changes that were noted were not those commonly seen in degenerative diseases of the nervous system—there were no ganglion cells with extruded or eccentric nuclei with vacuolation or an absence of Nissl's particles. The contrast between the gross lesions and the herpetic, in a case of fracture and another of malignant disease, was most pronounced.

The sheath of the ganglion also exhibited changes; the vessels were engorged and showed extravasations, and in severe cases there was an invasion of small round cells. In others not so severe the inflammation was noticed to have passed

away, leaving no trace behind in the ganglion. But the greater the severity of the eruption and the greater the scarring, the more certainly permanent changes occurred in the root ganglion.

On the subsidence of the inflammation absorption began, the effusion undergoing retrogressive changes. Ultimately the inflammation became converted into fibrous tissues, the density of the scar depending upon the severity of the original inflammation; thus in certain instances the scar occupied one-sixth to one-half of the ganglion, in which area all the structures were destroyed. The sheath became thickened, dense and fibrous.

In the Posterior Nerve Roots.—The changes in the posterior nerve roots corresponded to the results that might have been expected from the lesions of the ganglion. They consisted of an acute degeneration followed by a greater or less amount of secondary sclerosis, according to the severity of the acute destruction. The anterior root was in all cases normal.

In the Peripheral Nerves.—Marked secondary changes were produced in the fibers that enter the posterior root ganglion, depending, of course, upon the extent and severity of the disease. The degeneration seemed to have appeared and disappeared, and was replaced by sclerotic changes at the same periods after the initial lesion in the ganglion as in the case of the invasion in the posterior roots. Hemorrhage and inflammation occurred just as was noted in the ganglion. The degeneration could be traced back to the fine twigs which passed upwards to the skin to supply the area over which the eruption was distributed.

In the Spinal Cord.—As might be expected, such lesions of the ganglion as already described, were attended by acute degeneration of the root fibers in the posterior columns of the spinal cord. The degeneration appeared about the ninth or tenth day of the eruption. The products of degeneration were removed much more slowly than was the case of degeneration of the fibers in the posterior roots, but when the products were removed they left no perceptible sclerosis behind.

In Zoster of the Trigeminal.—Hemorrhagic foci were found in the Gasserian ganglion, together with destruction of nerve cells in that portion corresponding to the first or ophthalmic

division of the trigeminal, together with sclerosis of the root bundles, without there being, however, degeneration in any part of the central nervous system referable to the lesion in the Gasserian ganglion. The lesions observed in the Gasserian ganglion were an exact reproduction of what took place in the posterior root ganglion of other areas, and just as the sheath of the spinal ganglia became implicated in the lesion, so did the pia of the Gasserian ganglion show signs of thickening and infiltration. Degeneration followed in the root of the fifth nerve and degenerated fibers could be traced to the pons and into the medulla, the products of degeneration being removed just as in the spinal cord. The investigators concluded, therefore, that zoster of the branches of the trigeminal is associated with a lesion in the Gasserian ganglion similar to that found in the posterior root ganglion in cases of zoster of the trunk and limbs, and that the lesion causes secondary degeneration in the sensory root of the Gasserian ganglion within its extra- and intramedullary courses.

Accordingly, as the eruption of herpes zoster is caused by or is the outcome of an intense and concentrated inflammation of the posterior root ganglion of the nerve area involved, there is, to repeat, good evidence for believing that ophthalmic zoster is dependent upon definite lesions in the Gasserian ganglion, which ganglion is the homolog of a large number of posterior root ganglia, and it follows that such a lesion causes secondary degeneration in the sensory root of the Gasserian ganglion.

The Gasserian ganglion, according to Campbell and Head, may be considered as a triangle, from the inner angle of which the greater part of the central root fibers come off. The first or ophthalmic division of the trigeminal nerve enters the ganglion at the preaxial angle of the triangle, and the third or maxillary division enters at the postaxial angle and is connected with cells at the ganglion. The second division of the trigeminal is closely allied with the third division in nature and function, but the first, the ophthalmic division, is distinct.

Since we are accustomed to regard sensory nerves as conveying only afferent impulses, "it is difficult," according to Parsons, "to imagine how an inflammatory block in the course of the nerve can produce the pathologic changes in its distant terminations. It is a well established fact that the nerve fibers are under the trophic control of the posterior root ganglia, yet

the trophic control of the tissues supplied by the fibers is not so readily explained. It is probable that the ends of the nerve are subjected to some abnormal irritation, whether by blood clot, pus or other agent, and such irritation can only make itself felt in the reverse direction to the normal by an efferent impulse or by the transmission of deleterious agents along the nerve." Whatever the bacterial or other agent may be it seems to have a specific attraction for the posterior root ganglion. In this connection, it is interesting to include Sunde's report of a case of herpes zoster frontalis complicating a fatal bronchopneumonia. At the autopsy the Gasserian ganglion, on the side of the herpes, was found to be enlarged by an acute inflammatory process. Sections of the ganglion on the side of the zoster showed a number of Gram positive cocci arranged after the manner of diplococci or in short chains. This case of Sunde's suggests the appropriateness of including in this place the report by Howard of a case of herpes facialis accompanying pneumonia, in which hemorrhagic lesions akin to those of true zoster were demonstrable in the Gasserian ganglion.

Notwithstanding the fact that the occurrence is not constant nor frequent, the association of herpes zoster with pneumonia may not be without significance. In seeking to explain the mystery of the origin of zona ophthalmicus, the thoughts arise that there may be some association between it and pneumococcal infection, and of the likelihood of a transference of pneumococcic virus from the nasal passages to the Gasserian ganglion, which lies not too remote to be subject to infection by such a route. It is singular, indeed, that whatever the infection may be and the mode of its entrance in zoster ophthalmicus, it should manifest a predilection for the Gasserian ganglion, and for that ganglion only, and that in only the rarest of cases it affects structures distantly removed from the functions of the ganglion or external to its associations. As the process does not arise through the vascular system, but rather through the nervous, to which it is confined, the possibility of a direct transmission of infective material to the ganglion by way of the peripheral nerve twigs spread out in the nasal mucous surfaces ought not to be overlooked. It may be that the solution of the problem lies hid within the nasal chambers and that a thorough study of the sinuses in

a large number of cases may yield results fit to be associated with those already attained by Head and Campbell. The pneumococcus may be the true infecting agent, although its presence and activities await demonstration.

The changes in the skin, as outlined by Head, based upon his studies of sections through an unruptured vesicle of herpes zoster, show an unilocular cavity, the floor of which is formed of naked papillæ. These papillæ are infiltrated with masses of small round cells which stain deeply. The infiltration extends down to the terminations of the sweat glands and hair follicles, while here and there, in the deeper layers of the skin, too, are seen collections of small round cells apart from the hair follicles and sweat glands. The vesicle itself is split into incomplete cavities by septa extending from the roof to the floor. These septa are evidently the remains of incompletely raised epithelial layers that retain their attachment to the roof and to the floor of the vesicle.

The cavity of the vesicle is filled with fluid which coagulates under the influence of the hardening agent into a somewhat granular hyalin mass. Within this mass lie small round cells, which take the stain deeply, and broken down epithelial cells of all sizes and shapes which have lost their prickles. Restitution takes place under a scab, which consists of the contents of the vesicles, and in the covering of the base of the vesicles by an ingrowth of growing cells from the periphery. Nerve twigs can be traced in the deep layers of the corium, the axis cylinders and the neurilemma of which show swollen and degenerated sheaths, while larger branches show marked degenerative changes as early as ten days after the onset of the eruption.

Microscopic examination of sections of the skin revealed no signs of microorganisms, nor were there any in the serum contents of the vesicles; the vesicles, therefore, are undoubtedly sterile. It may be that the pathologic process of zoster is the same as that of ordinary inflammations, and that it is of toxic origin, the agent of which most certainly does not enter the system by way of the skin.

The vesicles begin to dry up and to form scabs about the fifth to the tenth day after their first appearance. At the end of six weeks, beyond some freshly healed scars, nothing is to be seen, and by the arrangement of the scars it is usually easy

to recognize it in a patient who has suffered from the disease even years after its occurrence. Where the skin is thin, scars rarely result; whereas the thicker the skin, the greater the likelihood of scarring, because the papillæ are placed deeper. The marks remaining are distinctly characteristic of the disease, and resemble none other, unless they be the pits of small-pox. They extend in lines like the branching of the twigs of a tree, or map-like, with clear spaces between the lines. They are more like erosions etching their way over the surface of the skin, but sharply limited from encroaching beyond the median line.

Generally, for several weeks after healing the skin may continue to be tender and remain anesthetic for many months. In some cases there may be cutaneous anesthesia dolorosa, as in my second case; in others the skin feels stiff or parchment-like and the scars may become keloid. It is not only that the parts affected remain painful, but their sensation, too, may be impaired; thus the cornea may be left anesthetic, and, therefore, especially disposed to ulceration from the action of foreign bodies, etc. Patients sometimes continue to suffer pain for months or years after the disease has subsided. There is partial or complete anesthesia in the region of the skin affected, which may continue after the subsidence of the pain and inflammation.

As a sequel of the corneal involvement, *nebulæ* or troublesome *phlyctenules* may be left, as in the case of the negro here reported. The scars on the cornea are invariably extensive and dense, the surrounding portions remaining hazy. The haziness of the cornea may continue for a long time, perhaps because it has lost the sensitiveness which it never fully regains. This fact must render the cornea especially prone to subsequent inflammatory trouble from the entrance of dust or other foreign body. The globe may continue injected and more or less sensitive for many weeks. Even when there has been only an infiltration of the cornea, the globe may remain tender.

The paralyzes may persist for weeks or months and then gradually fade; no permanent pareses so far have been reported.

The prognosis of ophthalmic zoster is less favorable than that of herpes febrilis, and, by the presence of complications

affecting the globe, it is rendered essentially worse. The prognosis must be grave when iritis develops. The pain may persist for a long time, the affected eye continuing irritable and subject to an increase of tension; and the older the patient the more is this neuralgia to be dreaded the longer it persists. The severity of both the eye lesions and the skin eruption is likely to be greatest in patients of advanced age. Therefore, the exhaustion consequent upon the pain and loss of rest becomes of serious moment.

The course may be over in three weeks; in other cases it may last from three to five months. The severity of the eruptive process may vary widely; in certain cases there may be only a single bleb at the limbus, while in others they may be so numerous that enucleation may be necessary. In conclusion, it may be accepted as a rule that when the eye is markedly affected the prognosis must be very guarded; vision may be wholly lost, owing to iritis or destruction of the cornea, or, in less grave cases, the eye may be left irritable and congested, or manifest increased tension long after the attack has subsided.

The disease is rarely, if at all, bilateral, and very rarely occurs twice in the same nerve area. It seldom relapses, although it has been known to occur three times in the same individual; when it does so recur, it is probable it depends upon some chronic peripheral irritation.

Stress must be laid on the fact that herpes zoster ophthalmicus is the frequent subject of mistakes in diagnosis. The disease may be mistaken for erysipelas, from which it should be distinguished by the acute neuralgic pain and the formation of vesicles in the course of the set of nerves. The inflamed area is confined to one side of the face, showing no tendency to spread. In erysipelas the eruption is, of course, not confined within such limits. Moreover, the vesicles in erysipelas are large, while in zoster they are small and coalesce in patches, corresponding to the terminal distribution of the nerve. By the formation of cicatrices the vesicles of zoster are distinguished from those of herpes febrilis, in which the epidermis alone is detached by the fluid, so that the vesicles of herpes heals without leaving any trace of its previous existence. From simple herpes zoster it is to be distinguished by the more severe course, the irritative symptoms persisting after the rup-

ture of the vesicles, and by the parenchyma of the cornea becoming deeply clouded at the spots where the vesicles were situated, and to the other symptoms iritis is often added. The more abundant the eruption on the two sides of the face, the less likely it is to be true zoster. The eruption of herpes about the lips and nose or in the cheeks common in febrile states, or in the course of nasopharyngitis, bears no relation to true zoster. This form of eruption is always bilateral, and the vesicles are noted for their recurrences, frequently returning with each cold in the nose. Zoster is rarely if ever bilateral; but as febrile herpes may be concurrent with zoster, an unusually wide distribution of herpetic vesicles may confuse its diagnosis. Febrile herpes is not accompanied nor preceded by the characteristic neuralgic pains of zoster.

When the rash appears it is well to dust it thickly with a powder consisting of oxid of zinc in rice starch. During the evolution of the vesicles an ointment of oxid of zinc and rice starch rubbed up in vaselin may prevent suppuration as well as foster the healing. Locally anodyn lotions are useful, as of leadwater and laudanum; when the globe is not affected, weak carbolic acid or belladonna. Ichthyol ointment, too, is valuable. Calamin lotions, if painted on early, have sometimes diminished the severity of the lesions. Arlt covered the side of the face with a mask of red celluloid and directed the patient to sit in the sun so as to get the therapeutic benefit of the red rays. In his experience, pain was relieved and healing followed without scars.

Internally, anodynes are nearly always required, as the severe pain must be mitigated by opiates and morphin hypodermatically. Quinin in full doses, iron, strychnin, arsenic, sodium salicylat, cod liver oil and a highly nutritious diet generally offer the best chance of combating the neuritis.

When ocular complications set in they should be managed on the general principles governing the treatment of conjunctivitis, keratitis, iritis, cyclitis, etc., from other causes. Carefully applied protective bandages, with which to seal the part from the air, may possibly ward off neuroparalytic keratitis. For this reason it should be employed when anesthesia is the only symptom, and it is imperatively demanded when there is destruction of the corneal tissue. The use of galvanism has been recommended for the relief of persistent neu-

ralgia. McNab has been gratified with his results of ionic medication, consisting of the introduction of sulphat of quinin by means of the positive pole over the whole area affected. Usually two applications to the skin area are sufficient, at an interval of from seven to ten days, using a current of one to one and one-half milliamperes per square inch of surface for fifteen or twenty minutes. He thus cured the neuralgic pains and the disturbance of local sensibility, as well as relieved the iritis.

The treatment of herpes zoster ophthalmicus is unsatisfactory; it is doubtful whether we can shorten the duration of the attack, and it is equally difficult to decide whether a rather shorter course than usual followed spontaneously, or can be due to the drug or other measures employed, for in many cases the evolution of the eruption is incomplete.

XXXIV.

FIFTY CONSECUTIVE INTRACAPSULAR CATARACT OPERATIONS.*

W. A. FISHER, M. D.,

PROFESSOR OF OPHTHALMOLOGY, CHICAGO EYE, EAR, NOSE AND
THROAT COLLEGE,

CHICAGO.

I wish to acknowledge the very great compliment your society has conferred upon me by extending an invitation to me to demonstrate the intracapsular operation, and I desire to especially thank your ophthalmic surgeons for furnishing the clinical material for making this demonstration possible.

Six cataract operations are not a sufficient number to draw satisfactory conclusions from, but your society can be congratulated for collecting such a large number, because a larger number are seldom seen in any clinic in America, and these cases with their results can be considered with the fifty I am reporting.

Loss of vitreous is usually considered the greatest obstacle to the intracapsular operation, and as these six cases were operated in a general hospital, without any special training of assistants, and without a loss of vitreous, it must be admitted that this complication has been exaggerated.

Instructions have been given to remove the bandages from these patients at the end of the ninth day, at which time the corneal wound should be closed, the anterior chamber reformed, the patients practically well, and no postoperative inflammation will be expected.

I trust your ophthalmic surgeons will report to your society the results of the operations performed this afternoon, and compare them to similar cases where the old operation was performed.

*Read by invitation before the Knox County Medical Society, Knoxville, Tennessee, June 8, 1915.

The profession outside of India is waiting for substantial proof of better visual results after the Smith Indian intracapsular operation than after the capsulotomy method, and a comparison of the results must decide which is the better method of removing a lens that is partially or entirely opaque. Accordingly, I append the results of fifty consecutive intracapsular extractions.

It is generally conceded that the removal of an opaque lens in its capsule is the best procedure if it can be safely done, but many objections have been made to this operation on account of the alleged greater dangers to the eye at the time of the operation. However, these are not as great as they have been pictured, and I believe the operation will gain in popularity when the technic is better understood.

There are objections to any method of removing a lens, but the one that offers the least will surely be the one generally adopted. It is the opinion of most operators that a lens can be more easily removed after rupturing the capsule, but there are objections enough to this procedure. If the capsule is ruptured with the capsulotome or capsule forceps, tags of capsule may become entangled between the edges of the corneal wound, which often causes postoperative inflammation, and a secondary operation, which is not without its dangers, is often necessary. However, when the capsule has been needled the patient has no positive assurance that the opening will be permanent.

If the lens is removed in its capsule the only danger that is worthy of notice is loss of vitreous, because if the capsule and lens are removed at once, postoperative inflammation will be rare and secondary operations unnecessary.

The modification of the Smith Indian operation which I proposed in a paper read before the Chicago Ophthalmological Society, March 16, 1915, and which was published in *Ophthalmology*, July, 1915, was written with the intention of making the operation possible for those unable to go to India. If this modification is generally adopted, many capsules will be ruptured, most of which will be due to lack of technic skill, but the capsule will often fall or be drawn down below the corneal wound, postoperative inflammation will be rare, and needlings will not be as frequent as in the old operation, even

though the capsule be retained, because it has a tendency to fall below the pupil and not obstruct the vision.

I believe a better result will be attained if my needle is used in every case, than would occur if the capsule is opened by capsulotome or capsule forceps, on account of the absence of postoperative inflammation.

I do not advocate the use of my needle for assisting in the delivery of the lens, except in cases where it cannot be delivered without excessive pressure, thereby inviting loss of vitreous; but the more expert the operator the less often will he be called upon to use the needle.

I seldom use the needle, but have it ready in position to be used when necessary; and I know from experience that it is not often necessary to perform a secondary operation when the capsule has been ruptured in this manner, and I feel that a loss of vitreous will be rare.

A good assistant is indispensable, but satisfactory training can be obtained by following the description of my modification of the Smith Indian technic (*Ophthalmology*, July, 1915.)

The Lids.—The lids must be held away from the eyeball in a manner that will prevent the patient from making pressure upon it, and I have found this impossible with ordinary eye specula.

Much thought has been given to the lids in this important part of the operation, Green of San Francisco having recently devised a speculum, and Vail of Cincinnati two lid elevators, one for the upper lid and one for the lower. These two clever operators had experience in India in the Smith clinic and have observed the danger that may be caused by the lids.

In my hands my lid hooks seem preferable to any instrument for controlling the lids that I have seen, but it may be because I am more familiar with them than with the others and have learned to rely upon them.

Description of the Operation.—A detailed description of the operation will be found in *Ophthalmology*, July, 1915.

FIFTY CONSECUTIVE INTRACAPSULAR CATARACT OPERATIONS.
FROM JANUARY 28, 1914, TO APRIL 13, 1915.

No.	Name	Age	Lens	Eye	Referred by	Address	Result
1	S. B.	57	Immature	R. E.	Dr. Thomas Faith	Chicago	20/15
2	O. H. B.	57	Immature	R. E.	Dr. H. A. Childs	Creston, Iowa	20/15
3	J. B.	74	Mature	L. E.	Dr. J. M. Williamson	San Francisco	20/20
4	P. N.	56	Immature	R. E.	Dr. H. W. Woodruff	Joliet, Ill.	20/20
5	E. C.	82	Immature	R. E.	Dr. H. W. Woodruff	Joliet, Ill.	20/20
6	H. B.	46	Immature	R. E.	Dr. Harry Gradle	Chicago	20/20
7	H. B.	46	Immature	L. E.	Dr. Harry Gradle	Chicago	20/20
8	J. M.	73	Mature	R. E.	Dr. Harry Gradle	Chicago	20/20
9	J. M.	73	Mature	L. E.	Dr. Harry Gradle	Chicago	20/20
10	J. M.	78	Mature	L. E.	Dr. Harry Gradle	Chicago	20/20
11	J. M.	57	Immature	L. E.	Dr. J. R. Hoffman	Chicago	20/20
12	A. L.	34	Immature	R. E.	Dr. J. R. Hoffman	Chicago	20/20
13	A. L.	34	Immature	L. E.	Dr. J. R. Hoffman	Chicago	20/20
14	S. M.	42	Immature	R. E.	Dr. Yarnell	Chicago	20/20
15	W. C. K.	57	Immature	R. E.	Dr. Treat	Decatur, Ill.	20/20
16	H. P. G.	59	Immature	L. E.	Dr. J. M. Williamson	Sharon, Wis.	20/20
17	Mrs. B.	37	Immature	R. E.	Dr. J. M. Williamson	San Francisco	20/20
18	A. R.	47	Immature	L. E.	Dr. J. M. Williamson	San Francisco	20/20
19	Rev. H.	73	Mature	L. E.	Dr. Langhorst	Elgin, Ill.	20/20
20	Wm. B.	51	Immature	R. E.	Dr. L. C. Barber	Lansing, Mich.	20/20
21	Wm. B.	51	Immature	L. E.	Dr. L. C. Barber	Lansing, Mich.	20/20
22	L. H. H.	54	Immature	R. E.	Dr. Van Meter	Linden, Iowa	20/20
23	L. H. H.	54	Immature	L. E.	Dr. Van Meter	Linden, Iowa	20/20
24	H. H. A.	41	Immature	R. E.	Dr. Wm. Mundt	Chicago	20/20
25	H. H. A.	41	Immature	L. E.	Dr. Wm. Mundt	Chicago	20/20

FIFTY CONSECUTIVE INTRACAPSULAR CATARACT OPERATIONS—Continued.

No.	Name	Age	Lens	Eye	Referred by	Address	Result
26	Rev. V.	71	Immature	R. E.	A. D. Chidlow (Medical Student)	Chicago	20/20
27	J. P. H.	75	Mature	R. E.	Dr. J. R. Hoffman	Chicago	20/20
28	S. M.	42	Immature	R. E.	Dr. Yarnell	Decatur, Ill.	20/25
29	O. N.	79	Mature	L. E.	Dr. Fisher's Clinic	Chicago	20/25
30	J. A.	69	Mature	R. E.	Dr. J. R. Hoffman	Chicago	20/30
31	A. Z.	74	Mature	R. E.	Dr. Fisher's Clinic	Chicago	20/30
32	Mrs. S.	49	Immature	R. E.	Dr. J. M. Williamson	San Francisco	20/30
33	R. C. L.	52	Immature	R. E.	Dr. R. C. Lyons	Naylor, Mo.	20/30
34	J. D.	73	Mature	R. E.	Dr. H. N. Lebensohn	Chicago	20/40
35	A. R.	47	Immature	R. E.	Dr. J. M. Williamson	San Francisco	20/40
36	J. C.	57	Mature	L. E.	Dr. J. R. Hoffman	Chicago	20/40
37	C. C.	50	Immature	R. E.	Dr. J. M. Williamson	San Francisco	20/50
38	C. A.	71	Mature	R. E.	Dr. Fairhall	Danville, Ill.	20/50
39	W. H. E.	77	Mature	R. E.	Dr. C. E. West	Decatur, Ill.	20/60
40	F. W.	70	Mature	R. E.	Dr. Converse	Chicago	20/65
41	Mrs. N.	72	Mature	R. E.	Dr. H. W. Woodruff	Joliet, Ill.	20/65
42	R. N. A.	49	Immature	R. E.	Dr. H. W. Woodruff	Joliet, Ill.	20/70
43	M. K.	60	Immature	R. E.	Dr. H. M. Lebensohn	Chicago	20/70
44	M. S.	39	Immature	L. E.	Dr. Albro	Chicago	20/80
45	H. B.	79	Immature	R. E.	Dr. J. H. Hutton	Chicago	20/80
46	T. O.	80	Mature	R. E.	Dr. Fisher's Clinic	Chicago	20/100
47	N. S.	49	Immature	L. E.	Dr. J. M. Williamson	San Francisco	20/100
48	Mrs. N.	72	Mature	L. E.	Dr. H. W. Woodruff	Joliet, Ill.	20/200
49	J. D.	58	Immature	L. E.	Dr. J. R. Hoffman	Chicago	20/200
50	S. B.	57	Mature	L. E.	Dr. Thomas Faith	Chicago	0

SUMMARY OF VISUAL RESULTS.

THIRTY-TWO IMMATURE CATARACTS AND EIGHTEEN MATURE.

20/15.....	2	20/60.....	1
20/20.....	25	20/65.....	2
20/25.....	2	20/70.....	2
20/30.....	4	20/80.....	2
20/40.....	3	20/100.....	2
20/50.....	2	20/200.....	2
		Lost eye.....	1
Number having 20/40 and better.....			36
Number having 20/50 and lower.....			14

CAUSES OF POOR VISION IN THOSE HAVING 20/50 OR LESS.

No. 37. Central choroiditis; granular casts found before operation.

No. 38. Ruptured capsule; no postoperative inflammation. Requested to return for needling.

No. 39. No postoperative inflammation. 20/60 vision without correction, high myopia, central choroiditis.

No. 40. Detached choroid.

No. 41. Central choroiditis.

No. 42. Operated at Illinois Charitable Eye and Ear Infirmary; no postoperative inflammation; records state bandage was removed the ninth day, wound closed, eye quiet; no other record except vision 20/70.

No. 43. Operated at Illinois Charitable Eye and Ear Infirmary; no postoperative inflammation; records state bandage was removed the ninth day, wound closed, eye quiet; no other record except vision 20/70.

No. 44. Optic atrophy.

No. 45. No postoperative inflammation; central choroiditis; opaque nerve fibers can be plainly seen.

No. 46. Temporary insanity. Patient removed bandage every night; fellow eye lost by the capsulotomy method.

No. 47. Nystagmus. Eye amblyopic since child; was operated upon for convergence when ten years old.

No. 48. Central choroiditis.

No. 49. Detached retina.

No. 50. Hemorrhage of the choroid: enucleation.

Of the fifty cases there are only two, 40 and 49, in which

the poor vision might be charged to the method of operating: one a detached choroid which reattached itself, the other a detached retina. But similar results follow the capsulotomy method quite as often.

There was only one complete loss of the eye, and that was due to hemorrhage of the choroid (No. 50), but that could not be charged to the method of operating.

The advantages of the intracapsular operation seem to be generally accepted because of the good visual results, and they are obtained chiefly on account of the lack of postoperative inflammation.

If postoperative inflammation can be avoided in operating for cataract, good vision may usually be expected when the cornea is clear and the fundus normal; and the operation of choice will surely be the one that offers the least number of postoperative inflammations.

One of the great advantages of the intracapsular operation is that the operation can be performed before the patient is blind, when his health and spirits are good.

ABSTRACTS FROM ENGLISH OPHTHALMIC
LITERATURE.

BY

WALTER R. PARKER, M. D.,

DETROIT.

WM. EVANS BRUNER, M. D.,

CLEVELAND.

EDGAR S. THOMSON, M. D.,

NEW YORK.

NELSON M. BLACK, M. D.,

MILWAUKEE.

EDWARD C. ELLETT, M. D.,

MEMPHIS.

GEORGE S. DERBY, M. D.,

BOSTON.

A Case of Acute Primary Pneumococcal Choroiditis.

CLEGG, J. GRAY (*Ophthalmoscope*, June, 1915). A rare case of pneumococcal choroiditis is reported, occurring in a young man of twenty-seven years of age. Examination of the fundus after rapid failure of vision showed the media clear, but the disc was slightly blurred and the retinal vessels were full. Two whitish areas with fairly well defined margins were visible, one above and one below the fovea. The upper one was roughly oval, and the vertical long diameter was about one and one-half times that of the optic disc; the lower was crescentic, with the concavity upwards, also one and one-half disc diameters in length.

The condition so closely resembled a tuberculous lesion that injection of bovine and human tuberculin were given. The eye became more irritable, the cornea was hazy, anterior cham-

ber deep, pupil wide with large dilated vessels in the iris; vitreous full of opacities, areas of exudation very indistinct, and disc not visible. Panophthalmitis developed and the eye was enucleated.

The pneumococcus alone was found in the specimens. The vitreous and choroid, after being kept in a closed bottle in the cold for six days, during which the cocci would die, were then introduced under the skin of a guinea pig, which was afterwards killed and examined, but no sign of tubercle was found. The other eye remained perfectly healthy. W. R. P.

Progress in the Treatment of Cataract in India.

SMITH, LT.-COL. HENRY (*Ophthalmoscope*, June, 1915). Statistics from the official records are given, showing the progress in the treatment of cataract in India.

The Punjab and Northwest frontier in 1881 had two hundred and sixty-five cataract operations; in 1913, 16,236. The United Provinces and Oudh in 1881 had 2,640; in 1913, 9,908. Bengal Provinces with Calcutta in 1881 had 357; in 1913, 1,291. Madras Presidency and City in 1882 had 480; in 1913, 1,655. Bombay Presidency and City in 1883 had 193; in 1913, 1,586. The Central Provinces in 1883 had 27; in 1912, 922.

The phenomenal progress since 1900 in the Punjab, compared with the other provinces of India, is cited as due to the superior result of intracapsular extraction. More than 31,000 cataracts a year are performed in the Indian empire, more than half of which are performed in the Punjab.

The remainder of the article is taken up with a plea for the establishment of a school of ophthalmology in India.

W. R. P.

A Clinical Study of Fifty-five Cases of Intraocular Retention of Foreign Bodies, With Results Two Years Afterwards.

BROWNLIE, W. BARRIE (*Ophthalmoscope*, July and August, 1915). The most important points in the diagnosis and treatment of foreign bodies in the eyeball are discussed in detail, and individual cases described briefly in so far as bearing on the points of the paper. The great majority of the cases were examined two years after the date of injury, which adds greatly to the value of the statistics. Nonmagnetic foreign bodies are not included.

In the diagnosis of the presence of a foreign body in the eye the following points are considered:

1. The history.
2. Vision of both eyes.
3. External examination of the injured eye, aided by a convex lens with oblique focal illumination, and a Coddington lens, if necessary. This includes:
 - (i) The eyelids and surrounding parts;
 - (ii) The cornea;
 - (iii) The depth and contents of the anterior chamber, e. g., hyphema and hypopyon;
 - (iv) Shape of the pupil;
 - (v) Engagement in or actual prolapse of iris through the wound;
 - (vi) Iris;
 - (vii) Lens;
 - (viii) Anterior part of the vitreous humor;
 - (ix) The globe outside the cornea.
4. The tension of the eye.
5. Ophthalmoscopic appearances.
6. X-ray diagnosis.
7. Electromagnet diagnosis.

The importance of a careful history of the injury is illustrated by a case in which the history of having been struck in the eye by a chip of iron rust four days previous to examination, was ignored because examination of the eye failed to show any sign of a recent wound or abrasion. No X-ray was taken. Two and one-half months later it became necessary to enucleate the eye, owing to recurrent iridocyclitis with practically no vision and a tendency to soften. The day before operation an X-ray was taken and showed a piece of metal lodged in the outer part of the sclera, which was found at operation.

The vision of both eyes is always taken; the two common causes of failure are traumatic cataract and hemorrhage.

The external examination of the injured eye is very carefully carried out for the presence of a wound, and, if present, to determine whether it is penetrating or not. As a rule, there is no pain after a recent injury of this sort.

The tension is important, both in diagnosis and in prognosis. A greatly diminished tension from loss of vitreous

usually shows a loss of vision at the time of the injury. Later on, a sudden diminution in the tension, with corresponding loss of vision, indicates either a vitreous hemorrhage, or usually a detachment of the retina at the site of the original wound.

Careful search is made with the ophthalmoscope for the foreign body or for evidences of its presence, and this is followed by an X-ray examination and the electromagnet. Should the electromagnet examination be negative, and the X-ray positive, a second plate is taken to confirm the first finding. The reasons for taking the X-ray plate before using the magnet are: First, the position of the foreign body can be determined with accuracy. Secondly, the size of the metal can also be estimated with a fair degree of accuracy. If the metal is large and the eyeball is badly damaged, it is better to give a general anesthetic and obtain permission for enucleation, if thought necessary; otherwise much unnecessary pain to the patient is caused, and the probability of a second operation for enucleation of the eyeball is avoided. Thirdly, there may be more than one foreign body present.

Boxer's method of localization of foreign bodies in the eye is described. But the method of Maitland Ramsay has been adopted for the following classes of cases: (1) Where the X-ray plate, as taken by the first method, suggests that the foreign body is embedded in the sclera, or is outside the eyeball, and where the electromagnet gives a negative result; (2) where the case is not a recent one.

The chief point in the treatment is to get rid of the foreign body as soon as possible. A piece of metal retained in the eye, especially in the vitreous, over twenty-four hours, generally sets up an iridocyclitis, either of the slow plastic type, or of the more acute and purulent variety, which is liable to end in the slow destruction of the eyeball with resultant phthisis bulbi or panophthalmitis.

Many cases have been recorded where the foreign body has been lodged in the eye, especially in the lens, for many years, without giving rise to inflammation; but these cases are always to be considered dangerous, as some day, without apparent explanation, the eye may suddenly develop an attack of acute inflammation. Ramsay cites two cases to illustrate this point. In one the piece of metal, apparently, was in the ciliary region

for twenty years without giving rise to any symptoms, and then suddenly an attack of acute inflammation commenced in the eye. In the other the metal was lodged in the lens for eleven months without any discomfort, and, again, the eye suddenly developed acute iridocyclitis at the end of that time.

Atropin is instilled and local anesthesia used in most cases. General anesthesia is restricted to the following class of cases: (1) Where the patient is very nervous, and where any sudden movement on his part, when the point of the magnet is in the anterior chamber or vitreous, might result in traumatic cataract or loss of vitreous. (2) Where the foreign body is suspected to be nonmagnetic from the history—e. g., gunshot wounds—and where it may be necessary to enucleate the eye if the foreign body cannot be removed. (3) Where the X-ray plate shows the presence of a large piece of metal and the condition of the eyeball suggests the possibility of enucleation.

Three kinds of magnets are described: (1) The vertical or suspended magnet. (2) Haab's stationary horizontal giant magnet. (3) The Hirschberg hand magnet. Of the two giant magnets, the writer prefers the suspended one.

The different procedures adopted in the different classes of cases and the difficulties which may arise and the means of combating them are then related.

When the metal was in the anterior chamber, embedded in the iris or behind the iris, where the wound was corneal, or corneoscleral, the method adopted was to try, if possible, to extract the metal through the original wound by introducing the point of the hand magnet into the anterior chamber. If necessary, the corneal wound is enlarged, and if at all large, it is covered by conjunctiva.

1. Where the wound was corneal or corneoscleral, and the metal embedded in the lens, the giant magnet with No. 1 point was applied over the center of the cornea, to try to draw the metal into the anterior chamber. If this was successful, then a sharp point of the small magnet or of the giant magnet, with reduced current, was introduced through the original wound, if large enough, or otherwise through a limbal incision, and the foreign body was extracted from the chamber. The cataract was dealt with later.

2. If the metal did not move from the lens after repeated

attempts by the giant magnet, or even after actual application of a sharp point to the lens, then, unless there were symptoms necessitating the immediate removal of the lens, the case was left alone for a few days, when the magnet was again applied in the hope that the lens matter having become more swelled, the foreign body would be less firmly embedded. If this was again unsuccessful, then the case was left until the lens matter required to be drawn off. Sometimes when the incision was made for the drawing off of the lens matter, the foreign body escaped along with the gush of lens matter. If it did not do so, then the sharp point of the magnet was introduced through the incision and the foreign body extracted.

3. Where the metal was in the vitreous chamber. In every case an attempt should be made to draw the metal into the anterior chamber and extract by that route after a limbal section. There are several reasons for adopting this route: First, where the wound is in the ciliary region, if the metal is extracted by the original wound route, further damage to the ciliary region is caused and considerable hemorrhage may result. Second, where the wound is in the sclera, extraction by this route sometimes entails more loss of vitreous, a serious thing in itself, besides, any tag of vitreous hanging out of the wound is an excellent culture medium for micro-organisms.

It is often impossible to draw the metal into the anterior chamber by the giant magnet. The extraction is attempted through the original wound, if in the sclera, first dissecting up the conjunctiva around the wound so as to cover it. If the scleral wound is small, or the wound corneal, a meridional scleral incision about six millimeters long, commencing ten millimeters behind the limbus, is made under a conjunctival flap.

Sclerotomy, either near the foreign body, if localized, and insertion of the magnet point into the vitreous, is not favored because of the risk of subsequent detachment and because of the fear of vitreous prolapse and infection.

Sclerotomy in corneal wounds with a foreign body in the vitreous is restricted to the following conditions:

1. Where signs of anterior uveitis have already developed. To draw a piece of metal into the anterior chamber under these conditions is to open up fresh paths of infection.

2. Where the foreign body is in the vitreous, or sticking in the sclera at the back of the eyeball, and where external application of the magnet produces no result.

3. Where the foreign body has been in the vitreous several days. In a case of this sort the foreign body becomes fixed by organized exudate around it, and not only is it more difficult to move by external application of the magnet over the cornea, but also the dragging of the metal, if it does move forward, produces considerable damage to the interior of the eyeball, owing to its fixation in the tissues. In these cases it is better to localize the foreign body in the vitreous, perform a scleral puncture near the site, and insert a sharp point of the hand magnet, or of the giant magnet with reduced current, into the wound.

4. Where the foreign body was noticed with the ophthalmoscope to be embedded in the retina and sclera at any part of the globe.

5. Where the metal was suspected to be or had actually been localized behind the globe in the orbit. The actual condition of the eye is of more importance than trying to explore the orbit for a foreign body, where it usually does little harm.

After-treatment.—The hopelessly damaged eyeball should be removed straightaway. If there is a doubt as to whether removal is necessary or not, a few days will decide the issue, the metal being removed in the meantime. Where there is threatening panophthalmitis, enucleation is indicated. In the writer's experience no harm results, provided enucleation is done at an early stage. (To be continued.) W. R. P.

Choroidal Sclerosis.

WOOD, C. G. RUSS (*Ophthalmoscope*, August, 1915). Primary sclerosis of the choroidal vessels is an uncommon condition, the literature containing very little information about it. It is characterized by atrophy of the hexagonal epithelium and choriocapillaris, the red fundus becomes browner in tint, due to the exposure of the choroidal stroma with its pigment. The larger choroidal vessels, being exposed by the loss of the pigment epithelium and capillaries, stand out clearly, which appearance is accentuated by white lateral streaks on the vessels. There are no signs of inflammation; the condition appears to be a slow degeneration of the vascular

tissues. Roughly, three varieties may be recognized, named, according to the areas in which they occur: the "macular," which chiefly, but not entirely, occurs in old people; the "peripapillary," which is most frequently met with; and a "general sclerosis" of the entire visible choroidal vessels. The ophthalmoscopic appearances are limited to the areas named, and, in addition to those previously mentioned, there are frequently small hemorrhages which appear to be very thin, so that the vessels can be dimly seen through them. The disc is pale, as a rule, and may show signs of atrophy; the retinal vessels are in most cases unaffected. The white lateral streaks on the choroidal plexus, in advanced cases, extend across and coalesce, so that the vessels become bands of a creamy white color.

The etiology is obscure. The macular variety occurs chiefly in old people, and may be looked on as a senile degenerative process. The majority of cases of the second variety seen by the writer were in women, the disease beginning in middle life and without symptoms of general arteriosclerosis in the vessels of the body, and without raised blood pressure. In the third variety, where there is general choroidal sclerosis, Adam says it is either due to syphilis, arteriosclerosis, or nephritis.

The pathologic anatomy is that of endarteritis, the vessels in extreme cases becoming mere fibrous cords.

The prognosis as regards vision is grave, especially in general sclerosis of the choroid. In the macular variety, although central vision is lost, total blindness does not result. In the perimacular cases also, total blindness does not take place. An important practical point in this connection is that choroidal sclerosis is not associated with cerebral sclerosis. On the contrary, when this disease attacks the retinal vessels, as well known, the cerebral vessels are usually concurrently affected. Hemorrhages certainly increase the gravity of the prognosis as regards vision.

A case is reported associated with the menopause, in which the patient complained of "zigzagging" of objects and diplopia. The case was under observation for two years, during which time there was a gradual development of sclerosed choroidal vessels. Treatment was of little avail.

W. R. P.

The Tragedy of Sclerostomy—An Account of Eight Examples of Late Infection.

BUTLER, T. HARRISON (*Ophthalmoscope*, August, 1915), reports eight cases of late infection following sclerostomy by the Holth punch operation. The cases are divided into three groups: 1. Acute cases, ending in acute uveitis and panophthalmitis, necessitating removal of the eye. 2. Cases of severe iridocyclitis, which destroy the sight. 3. Cases of mild iritis and local inflammation round the aperture, which recover.

Three of the eight cases were included in the first group, one in the second and three in the third. Brief descriptions of the cases are given. Every kind of scar was effected. In one case there was apparently firm cicatrization with no filtration; others had ectatic scars. In two a small buttonhole was made at the operation, which is considered an added danger. A thick flap of conjunctiva was always attempted, a thin covering to the aperture being obviously unsafe.

While the writer's cases were mostly healed with the punch, and therefore his conclusion cannot be applied to the trephine operation, he concludes that late infection is a peril hanging over every eye which possesses a filtering cicatrix of any type, however obtained.

W. R. P.

A Pedigree of Color Blindness, Including Two Color Blind Females.

NETTLESHIP, E. (arranged by C. H. Usher) (*Royal London Ophthalmic Hospital Reports*, Vol. XIX, Part 3). The pedigree contains twenty-nine color blind persons. Two of them are females. For other details regarding the affected members of the pedigree, with diagrams showing their relationship, one should consult the original article.

W. E. B.

Inflammation of the Uveal Tract Secondary to Infection of Mucous Membranes.

GOULDEN, CHARLES (*Royal London Ophthalmic Hospital Reports*, Vol. XIX, Part 3), attempts in this paper to collect some of the information available concerning inflammation of various parts of the uveal tract which appears in some way connected with infection of mucous membranes. He first gives some interesting statistics of his own cases. In thirty-seven cases of iritis sixteen were due to gonorrhea and nine-

teen to syphilis. In one hundred and forty-two cases of iridocyclitis a diseased mucous membrane was found in seventy-eight cases, sixty-four of them being due to septic teeth. In nine cases of disseminated choroiditis, one was due to septic teeth, and in four cases of a single patch of choroiditis, all of them were due to diseased mucous membranes, two of them being septic teeth.

The occurrence of an infection of a mucous membrane and an inflammation of the uvea in so large a proportion of cases is at least suggestive, and in many cases the effect of treatment of the mucous membrane upon the condition of the eye has been so beneficial that the connection can scarcely be denied. With one or two exceptions he discusses only cases of uveitis that do not end in suppuration. It is these cases that are so numerous, and except in case of syphilis so very difficult to treat: when it occurs in its commonest form, iridocyclitis, it may cause grave damage to the eye by frequent recurrence. These recurrences are common, and with each attack more and more damage is done. After iridocyclitis the next most common cases of uveitis that can be ascribed to mucous membrane infection are those in which a single more or less large patch of choroiditis appears, accompanied by deposits on the back of the cornea. It requires the help of experts to examine all mucous membranes before deciding that not one has an area of possible infection. Very little of the mucous membrane of the gastrointestinal tract is available for direct examination, so that unless very marked symptoms are present it may be erroneously inferred that parts really diseased are healthy. Bacteriology has helped in certain cases, and the preparation and administration of a vaccine from organisms discovered has given good results. It must be admitted that there are cases of uveitis in which, after every known method of examination and test, there is failure in detecting a cause.

He then takes up the various mucous membranes seriatim. Under the digestive tract the mouth is first considered under two heads, the teeth and the tonsils. Two conditions of the teeth can be accused of causing infection of the uveal tract:

1. Abscess in connection with a single tooth.
2. Pyorrhea alveolaris, in which there is a widespread infection of the tooth sockets.

This sepsis need not appear very severe, and it is not nec-

essary to have an extremely foul condition of mouth to produce uveitis. Cases of uveitis are seen in patients whose mouths on superficial examination appear in good condition, but upon expert investigation the tooth sockets are found to be infected.

Of all the diseases of the mucous membrane, sepsis in connection with the teeth is much the commonest, and consequently we should expect oral sepsis to be the commonest cause of uveitis. Cases are cited in detail to illustrate this condition.

That tonsils may be the cause, he states several instances in detail. The connection between uveitis and so-called intestinal autointoxication was raised by Elschnig in 1905. He published a series of cases of iridocyclitis in which indican was found in the urine. This, he insisted, was a sign of perverted metabolism. He found that in these cases by regulation of diet and the administration of intestinal antiseptics improvement of the eye followed when other methods of treatment had not succeeded.

Two forms are mentioned:

1. Iridocyclitis occurring especially in women in whom both eyes are attacked with keratitis punctata, posterior synechiæ, and vitreous opacities. It is insidious in onset and relapses are frequent. There is an acetone-like odor in the breath, constipation is present and indican may be found in the urine.

2. Recurrent iritis. It occurs in apparently healthy middle-aged women, and the eye recovers with or without posterior synechiæ. It attacks one eye only, there are frequent relapses, and the disease ultimately leads to blindness.

The author states that he himself has not seen cases of choroiditis due to intestinal autointoxication. He cites cases from literature in which the following diseases frequently had some bearing upon the inflammation of the uveal tract, gastric ulcer, dilated stomach, chronic dyspepsia, gastroenteritis, dysentery, colitis, appendicitis and typhoid fever.

The Respiratory System.—The nose, acute and chronic rhinitis, suppuration in the accessory sinuses, otitis media, bronchitis, pneumonia, measles and whooping cough are all illustrated as causes.

Gonorrhea receives much attention. As to the frequency of iritis due to this cause, statistics have been published by

various investigators and vary greatly. Sixteen out of thirty-seven cases of the author's were due to this cause. It is almost purely a disease of males and is very rarely seen in females. It requires an urethritis to be well established before the eyes become affected. The occurrence of arthritis together with iritis was remarked by the early observers. Iritis being merely a sign of general infection, it is not surprising that some other structure in the body should be affected. Arthritis usually precedes iritis, and it is such large joints as the knee that become painful and show signs of infection. Polyarthritis may occur. In all of his own cases the attack of iritis has been present in one eye first, and in none did iritis appear simultaneously in the two eyes. In several the attack has alternated, but in only one was there an attack of iritis in each eye at the same time. In all at one time or another the disease had affected each eye.

The clinical varieties of gonorrheal iritis are as follows:

1. Slight Iritis.—Clinically the usual signs of iritis are present, ciliary injection, dullness of the iris, and the rest. There is but slight tendency to the formation of posterior synechiæ, and even in cases which have not received efficient treatment, no synechiæ are left, only a few dots of uveal pigment on the lens showing the position of the pupil during the attack. It is remarkable that precipitates are rarely seen upon the back of the cornea in gonorrheal iritis in any of its forms.

2. Plastic Iridocyclitis.—This is much more severe and more commonly observed. The injection of the conjunctiva, edema of lids and discoloration of the iris are marked, and there is the tendency to considerable exudation into the pupillary area and formation of broad posterior synechiæ. These cases, if neglected, lead to complete synechia of the pupillary margin, grayish membrane in the pupillary area, and in some cases to grave nutritional changes in the eye resulting in lowered tension.

Being the most common type of gonorrheal iritis, it is the form commonly seen in relapsing iritis, and in its early stages often causes great difficulty in treatment, as it is found very difficult, even with the most energetic treatment, to dilate the pupil satisfactorily.

3. Exudative Iridocyclitis.—This is the type described by Mackenzie as typical of the iritis of gonorrhea. The char-

acteristic feature is the profuse exudation of lymph into the anterior chamber. It collects in the lower part of the eye as a translucent mass with a more delicate convex upper border, almost filling the anterior chamber. Under vigorous treatment recovery is complete and all traces of exudation disappear.

4. Hemorrhagic Iritis.—In this form hemorrhages occur in the anterior chamber. The author gives the history of a number of his own cases.

There is reason to think that all these patients who have relapsing iritis without reinfection from outside are really all the time reinfected themselves from an uncured condition of the deep urethra, chronic urethritis and chronic affections of the prostate, vesiculæ seminales and Cowper's glands. Certainly it is now proved that a urethra may remain infected for upwards of thirty years, and gonococci have been discovered in centrifugalized urine at this date after the primary infection.

Uterus.—The recurrence of inflammatory disease in the eye due to uterine disease has been acknowledged for many years. The two principal views can be placed under these headings:

(a) Reflex irritation of the sense nerves, or vasomotor paralysis; and in such cases sexual excess was supposed to play a great part.

(b) Metastatic infection. These metastases might be either bacterial or toxic; and it has been held, chiefly by French observers, that slight infections of the uterine cavity might cause metastatic inflammation of the eye.

Many cases have been recorded in which iritis has coincided with the menses. Others have been reported due to suppression of the menses, dysmenorrhea and endometritis. He sums up the paper with the following conclusions:

1. That it is most likely that many cases of uveitis, other than those due to syphilis and tuberculosis, are due to infection from a diseased mucous membrane.

2. That the most common cause of uveitis is oral sepsis.

3. That in the case of gonorrhœa and typhoid fever the proof is complete, showing bacterial infection of the eye during the course of these diseases.

4. That the findings of cocci, behaving, as regards staining

agents, like pneumococci, in a patch of choroiditis makes it almost certain that pneumonia may be a cause of uveitis.

5. That in any case of uveitis of which the cause is not obvious, every mucous membrane should be examined by inspection, and, if necessary, bacteriologically; and that if this be done the majority of such cases of uveitis will furnish at least one mucous membrane the seat of infection.

6. That cases of gonorrhea are very difficult to cure when once the deeper parts of the urethra have become infected; that such cases, if not completely cured, may become a source of very serious danger to the patient, not only at a short period after infection by the gonococcus, but even after many years of apparent immunity.

7. That the type of uveitis which consists of a solitary patch of exudation into the choroid, with vitreous opacities and keratitis punctata is always secondary to a source of septic infection in some other part of the body, and that source is usually a mucous membrane.

W. E. B.

Some Cases of Deep Inflammatory Deposits in the Choroid.

HEPBURN, MALCOLM L. (*Royal London Ophthalmic Hospital Reports*, Vol. XIX, Part 3), gives the history of some cases, and then concludes as follows:

The characteristic features common to this group of cases which serve to distinguish them from other forms of choroiditis are:

1. The History.—This is almost invariably one of sudden onset; and though the central vision is never completely lost, as, for instance, in a case of embolism of the central artery of the retina, there is considerable deterioration of sight to a varying and often alarming extent, which is due to the spread of edema from the inflammatory focus into the macula region. In all but the most severe cases this subsequently clears up and the vision returns again, and in some instances to 6/6.

2. The presence of vitreous opacities, which is practically a constant accompaniment of this form of choroiditis, and is well marked in the early stages, so much so that a patch of choroidal inflammation of this type should be suspected whenever a patient complains of "floating specks" together with sudden loss of sight.

3. An ill defined whitish area in the choroid, without any pigmentation, is seen ophthalmoscopically if the examination be made early enough; later on the increasing vitreous haze obscures the view, and the fundus is no longer visible until the acute stage has begun to subside.

4. The appearance of keratitis punctata, which is almost always present, is coincident with the increase in the vitreous opacity; and, therefore, at this stage all view of the fundus is lost temporarily, especially in severe cases. Opinions differ as to whether this necessarily indicates involvement of the ciliary body or not.

5. The Long Course.—Often several weeks or even months elapse before complete recovery takes place, and before we are in a position to examine the fundus in detail and make out the size and extent of the scarred area. In other forms of choroiditis the course is a relatively short one.

6. The ophthalmoscopic appearance of the choroidal scar. This generally takes the form of an irregularly circular white fibrous tissue scar with pigment proliferation, mostly concentrated round the edges of the affected area, and not so much over the surface, as in many other forms of choroiditis.

7. No choroidal vessels as a rule can be seen as single trunks crossing the floor of the affected area.

8. The Etiology.—These cases are almost certainly never of syphilitic origin, and it is the last thing one ought to think of in connection with this special type. All of the cases that I have seen have had a history pointing to some other mode of infection (e. g., pleurisy, teeth, intestinal infection, etc.).

9. The sector-shaped defect in the visual field. A certain amount of controversy ranges round the various theories brought forward to explain the sector-shaped scotoma. They may be stated as:

(1) Pressure on the nerve fiber layer, and so destruction over the site of the inflammatory deposit (von Blessig and Gros Petersen).

(2) Pressure on or thrombosis of the retinal vessels supplying the affected area (Jensen, Ham).

(3) A blockage of a portion of the choroidal circulation at the site involved.

10. The prognosis, as regards central vision, is usually good, even in some of the worst cases, because the macula

is never permanently injured. This fact justifies an optimistic view during the tedious period of recovery common to this group.

W. E. B.

Four Cases of Melanoma of the Choroid, With a Pathologic Examination in One Case, and One Case of Unusual Chronicity, After Dissemination of a Melanotic Sarcoma Had Occurred.

MOORE, R. FOSTER (Lang Research Scholar), (*Royal London Ophthalmic Hospital Reports*, Vol. XIX, Part 3). The clinical appearances in all four cases were in every essential precisely similar, the differences being only as regards size, shape, position, and density of color of the growths.

In size they varied from about one-half the area of the optic disc to about four times its area.

They were roughly circular or oval in outline. The edges were everywhere quite definite without being quite hard and sharp; there was no shading off into the surrounding fundus, nor was there any light fringe or evidence of pigmentary disturbance at the edge.

They were of quite homogeneous appearance, and the choroidal pattern, though plainly seen around (in two cases), was not seen over the area of the growths.

In color they were exactly that of "blue ointment," differing only in their density.

All were single and close to the optic papilla, the one farthest away being distant about two discs' breadth.

The retinal vessels in their course as they crossed the growths were markedly darker in color than elsewhere; this no doubt was owing to the fact that they were seen against a darker background; the contrast was well seen at the points where they reached the area; in all other respects the vessels were normal in appearance, the overlying retina itself looked quite natural.

In the case of the three smallest growths, although the retinal vessels had an appearance as if riding over a slightly raised area, I was unable to be sure of any difference in refraction between them and the vessels of the surrounding retina; in the case of the largest growth, however, a difference of 2 D. was estimated.

The visual acuity was not affected, and there was no sco-

toma corresponding with the area of the growth in the two cases in which this was examined for.

During the time the patients were under observation (six weeks, five and one-half months, five and one-half months, ten days) there was no change in the appearances.

There was no abnormal pigmentation of the eyes discoverable on external examination.

It would seem that the term melanoma is applied to growths which are most probably of congenital origin, which do not alter in appearance or in size, and are composed of aggregations of deeply pigmented chromatophores.

It would seem that in a certain number of cases, melanomata, benign tumors of congenital origin, in whatever part of the globe they lie, may in the course of years acquire malignant characters, and give rise to metastases.

I suggest that there is evidence that in the case of a minimal pigmented growth of the choroid, the presence of some or all of the following characters may prove to be evidence of malignancy: A simple nonfeathered edge; the presence of stippling or vesicle-like bodies in the overlying retina; irregular pigmentation; any subjective symptoms such as micropsia or possibly a partial scotoma; and evidence of pigmentary disturbance around the edge; that in their presence an accurate outline drawing be made, using the retinal vessels as lines of latitude and longitude, and that increase in size, demonstrated by such means, should lead to enucleation.

W. E. B.

Color Vision and Tests for Color Blindness.

DEVEREUX, C. (*British Medical Journal*, December 26, 1914). This article is in the main a review of the criticisms of the work of Edridge-Green. The author is strongly in favor of the Edridge-Green lantern as opposed to the wool tests used by the Board of Trade.

E. S. T.

Collosol Argentum and Its Ophthalmic Uses.

ROE, A. LEGGE (*British Medical Journal*, January 16, 1915). Collosol argentum is a clear sherry-colored liquid, and, as described by the maker, is a solution containing the metal silver in a colloid form. The silver is present in a metallic state, not as a salt. The actual particles are of extreme

minuteness, and they pass readily through the pores of a filter, and are visible only under the ultramicroscope. It is claimed for this preparation that no microbe is known that is not killed in laboratory experiments in six minutes. The author considers it "the most useful preparation that has been placed in our hands since the introduction of cocain." He has used it "many thousands of times," and has never known it to give the slightest irritation. It may be used for months without staining the conjunctiva. He has found it especially useful in purulent ophthalmia, in infected ulcers of the cornea, interstitial keratitis, blepharitis ulcerosa and dacryocystitis. In the various forms of conjunctivitis he has not found it to be so efficient as the ordinary remedies. The paper is based on an experience of three years. E. S. T.

The Wassermann Reaction in Ophthalmic Practice. A Record of Two Hundred and Fifty Cases.

MANSON, WILLIAM HISLOP, MACKIE, THOMAS J., AND SMITH, H. EDGAR (*British Medical Journal*, February 20, 1915). The authors lay stress upon the well recognized fact that the positive results of the Wassermann reaction are of great value. The conclusions to be drawn from negative results are less definite, since in the tertiary and latent stages of syphilis, only seventy-five per cent and fifty per cent, respectively, yield a positive result. In interstitial keratitis, the reaction was positive in 88.8 per cent. In strumous keratitis, the results were negative in all. In iritis and iridocyclitis, these cases were obtained in two series: Twenty-two in the first group gave twelve positive and ten negative results. In the second group of twenty-eight cases, fifteen were positive, twelve negative, and one doubtful. Three cases of cyclitis, uncomplicated, were negative. In choroiditis, of twenty-six cases, five gave positive and twenty negative results, while one was doubtful. Four cases of sympathetic ophthalmitis gave negative results, as also did three cases of retinitis pigmentosa. Five cases of retinal detachment gave negative results. Inflammation of the optic nerve and retina, only five positive cases were obtained out of a total of fourteen. In optic atrophy, of twenty-one cases, fifty-seven per cent gave positive results, and it is interesting to note that ten diagnosed as primary optic atrophy were all positive. The thir-

teen cases of paralysis of the ocular muscles gave seven positive results, of which four were in paralysis of the third nerve. All six negative results were in paralysis of the sixth nerve. One case of dacryocystitis out of three gave a positive reaction. Six cases of myopia with choroiditis were examined. Two gave a positive reaction. Four cases of glaucoma were examined, with one positive result. It is interesting to note that out of the total number of cases of various diseases examined, fifty per cent gave a positive reaction.

E. S. T.

A Case of Bilateral Optic Neuritis Due to Sphenoidal Sinuitis.

BRADBURN, A. ALISON (*British Medical Journal*, January 16, 1915). This case was reported on account of the implication of the abducens nerve, and the fortunate termination, which, according to the researches of the author, seem not to have been recorded before.

The patient was a married woman, aged twenty-seven years, of good health. She consulted the author in January, 1914. About Christmas she had suffered from a severe cold in the head, accompanied by a copious nasal discharge, but it had cleared up without treatment. Recently vision had become blurred, and there was a tendency to diplopia. Examination revealed a slight weakness of the left externus, the vision in this eye being 5/9. An examination by a rhinologist gave no important data, but the persistent occipital headache was suggestive of sphenoidal sinus suppuration. Tampons of cocaine and adrenalin were applied to the body of the sphenoid, with a view of attempting operation, but the patient became so nervous that the operation was deferred. The following day a profuse discharge of thick yellowish pus occurred, which continued for more than a week, at the end of which time the neuritis slowly subsided and the abducens paresis gradually cleared up.

E. S. T.

The Treatment of Trichiasis by Means of the X-Ray.

KEMPSTER, CHRISTOPHER (*British Medical Journal*, February 20, 1915). The method followed is to cocaine the eyeball. Protect it carefully with a thin sheet of lead and then expose the lid margin containing the cilia to the anticathode at 10.5 centimeters distance. The exposure lasted five and

one-half minutes. At the end of two weeks some of the cilia were beginning to fall. At the end of three weeks they were quite loose in the follicles, and at the end of four weeks they had nearly all fallen.

E. S. T.

Removal of Eyes in the Presence of Orbital Cellulitis.

LISTER, W. T. (*British Medical Journal*, March 6, 1915). In order to prevent infection of the nerve sheath in such cases, the following plan appears to the author to be a good one:

1. The contents of the globe are thoroughly eviscerated, all traces of retina and choroid being scraped away to avoid any chance of sympathetic ophthalmia.

2. The muscles are divided.

3. The sclerotic is pulled forward and divided far back, leaving only a frill around the intact optic nerve.

In this way all risk of infection of the nerve sheath and the meninges, as the result of the operation, is avoided. There is very little bleeding, the shock due to cutting the optic nerve does not occur, drainage for the cellulitis is afforded, and the healing process is not prolonged by leaving in the bulk of the sclerotic.

E. S. T.

Serious Injury to an Eye From a Bursting Golf Ball.

ELLIOT, R. H., AND INMAN, W. S. (*British Medical Journal*, March 20, 1915). The case was a child, seven years of age, who was watching a man using a knife to open the core of the golf ball. The child was sitting on the opposite side of the table, when the core suddenly burst, throwing some very irritating fluid into his right eye. The cornea was rendered whitish and opaque, and the final result was a dense opacity which seriously diminished the vision. A number of cases occurring in recent literature are mentioned.

E. S. T.

Hereditary Aniridia—An Interesting Family History.

RISLEY, S. D. (*Jour. Amer. Med. Assn.*, April 17, 1915), reports a case of aniridia, and traces a very large family connection, many of whom show the defect. The summary is as follows:

One son, two eyes (aniridic).

Second generation: Male, four, eight eyes; female, nine, eighteen eyes.

Third generation (patient belongs here): Male, thirty-two, fifty-five eyes (condition of four individuals not known); female, thirty-one, sixty-two eyes.

Fourth generation: Male, nineteen, thirty-two eyes, two eyes cataractous; female, twenty-three, forty-four eyes (condition of two eyes not known). E. S. T.

A Case of Intracranial Traumatic Arteriovenous Aneurism Affecting Both Eyes.

SYM, W. G., AND MILES, ALEXANDER (*Ophthalmic Review*, January, 1915). This case is of particular interest from the fact that the right eye was enucleated to check hemorrhage from numerous bleeding points in the conjunctiva which developed subsequent to a fracture of the middle fossa of the base of the skull. Eight weeks after the accident, when the left eye began to exhibit symptoms identical with those shown by the right, viz., prominence and congestion of the globe, restriction of movement, difficulty in raising the eyelid—the patient was brought to Dr. Sym and a diagnosis of traumatic arteriovenous aneurism on the right side was made.

The right common carotid artery was ligated a short distance below the bifurcation.

The patient made a perfect recovery and vision in the eye returned to 6/6, having previously fallen to 6/18.

N. M. B.

A Case of Retinal Detachment in a Myope, Treated With Rest in Bed, Retaining Useful Vision for the Past Two Years.

JAMES, R. R. (*Ophthalmic Review*, January, 1915), reports the case of a male, age forty-four years, who eighteen years previously had an injury to his left eye. In November, 1912, he returned to the hospital, having had bronchitis and a good deal of cough for the past month. Three days before admission he had a severe coughing spell, and two days later could not see properly with his right eye. Pupil reacted to light. Tension normal. A large detachment was present in the lower part of the eye, the field being diminished upwards. There was some slight vitreous opacity, mostly rather coarse floaters, and no hole in the detached retina. Vision 6/60 with — 13.0 sph. The left eye was divergent,

absolutely blind, with a yellow chalky looking opaque lens and some recent hemorrhage in the anterior chamber. The tension was a little full.

He was put to rest flat in bed, his head steadied between sandbags, a cough mixture prescribed, and after the first week was ordered subconjunctival injections of normal saline twice weekly.

A year and eight months later his vision was 6/12, the field showed only a slight contraction downwards, due to a patch of choroiditis in the upper part of the fundus.

The author emphasizes the point that detached retinae do occasionally reattach themselves; and that the treatment for detachment by puncture or cautery has never left an eye with such good visual result.

He does not think the subconjunctival injections were of any material service. N. M. B.

An Operation for Epithelioma of the Lower Eyelid.

FERGUS (*Ophthalmic Review*, January, 1915). In operating upon a case of epithelioma involving the outer half of the lower lid, from which a large amount of structure required removal, Fergus determined to try a flap operation which is apparently original and which he describes by means of drawings which are more eloquent than several pages of text. An incision was made downward from the outer canthus, another parallel to it from the inner border of the growth, and their lower extremities connected by a transverse incision. The tissue included within their borders was removed. The outer incision was then extended downward, and a parallel incision made a little external to it, but going a little higher up, and the two connected by a transverse incision at their lower extremities. The included flap was dissected up and laid along so as to replace the lid which had been removed. The skin was loose and no difficulty whatever was experienced in approximating the edges of the space denuded by removal of the flap, as the latter had a broad pedicle; union took place at once. Unfortunately this operation cannot be used for men, as the flaps would extend into the hairy part of the face. The author suggests, however, that to avoid this the flap be cut upwards instead of downwards from the neighborhood of the outer canthus when the growth is at the outer part of

the lid; and for cases recurring at the inner aspect, to take the flap from the forehead, just above the nose, according to Enner's method. N. M. B.

Two Cases of Sarcoma of Choroid.

LAWFORD, J. B. (*Ophthalmic Review*, April, 1915). Two cases which present features of clinical and pathologic interest are reported with detailed pathologic findings and two plates illustrating microscopic findings. N. M. B.

Glaucoma and Trephining.

FERGUS, F. (*Ophthalmic Review*, May, 1915), states he introduced the operation of trephining for glaucoma in 1909, and performed the operation before the Oxford Ophthalmic Congress the same year.

He feels that there is no theory of glaucoma as yet advanced which is entirely satisfactory.

Two features seem to have escaped the notice of a good number of competent observers, i. e., the swelling of the retinal veins in the early stages, and the existence in a very considerable proportion of cases of an anterior chamber of normal depth, or, in some instances, of considerably increased depth. Where that occurs, of course, the explanation of high tension, by the mechanical blocking of the filtration angle, cannot hold good. No doubt the blocking which unquestionably does sometimes take place may very frequently be the cause of glaucoma, but it cannot possibly be that when the depth of the anterior chamber is not merely normal but is considerably deeper than usual. Another difficulty has arisen in his mind in accepting in its entirety Mr. Priestley Smith's teaching, and that is, that very often after iridectomy the circumlental space can be investigated, at any rate in the area of the colobomata; and quite recently he has come upon patients with high tension with normal depth of anterior chamber, and in whom the circumlental space was perfectly clear, allowing fluid to pass quite freely from the vitreous chamber into the posterior chamber and so into the aqueous and corneoid angle. The fact that Mr. Priestley Smith's views do not adequately explain some cases of glaucoma does not, of course, imply that they are not valid for certain others.

Suggestion is made for a means of measuring the depth of the anterior chamber.

Relative to Mr. Henderson's theory of glaucoma, the author says:

"I cannot accept Mr. Henderson's view that the intraocular pressure is the venous blood pressure, and that it is the increase in venous blood pressure which gives rise to glaucoma. It seems to me if that were true then glaucoma would all but invariably be a bilateral lesion; that directly the venous pressure rose sufficiently on one side as to cause glaucoma, it would inevitably do the same on the other. That we find not to be the case. In the second place Mr. Henderson is perfectly right in his definition of the word elasticity. I cannot hold that the eyeball is a chamber of absolutely fixed cubic contents which cannot be increased or diminished by one single iota. In the change of the curvature of the cornea itself there seems to be a proof that the eyeball is to a certain degree at any rate extensile, and that an increase in the cubic contents of the globe leads to a stretching of the membranes and in that way to an increase of pressure."

The author differs with Henderson relative to the condition of the blood vessels, stating: "In a number of patients whom I have recently examined the veins are distended, sometimes enormously so, and the arteries, if anything, are contracted," indicating with great probability that glaucoma is a vascular disease.

The following causes are suggested as possibly accounting for the increase of tension: First, hypersecretion in the neighborhood of the ciliary body. Second, want of elimination, which may be brought about either by some venous obstruction or by the obstruction of the lymphatics which drain the eyeball.

"One other fact remains tolerably clear, and that is glaucoma is not a disease associated with high arterial tension. The blood pressure has not been found to be unduly high in many glaucomatous patients; and, moreover, had high arterial pressure anything to do with the incidence of the disease, we should find it very frequently associated with Bright's disease, which we do not. I think the idea of a hypersecretion may be ruled out of count, which fact, if the above classification be adequate, leaves us only two possible determining factors, namely, either stasis in the veins or stasis in the lymphatics."

The advantages and disadvantages of iridectomy, sclerotomy, posterior sclerotomy and Lagrange's operations are discussed.

Fergus (*Ophthalmic Review*, July, 1915) describes his first trephining operation done in February, 1909:

"I made my first operation at the upper part of the sclera just above the cornea. A flap of conjunctiva was cut exactly as directed by Lagrange, and was folded over the cornea. I then applied the trephine, but found that it did not grip well, for the simple reason that I had not denuded the sclera entirely of all the conjunctival tissue. That is a step which must invariably be taken in this operation, otherwise the edge of the trephine is apt to slip about and to make the operation unduly difficult. I had, therefore, to stop the use of the trephine till I had absolutely removed all of the conjunctival tissue. There is another danger if this tissue is not thoroughly removed: it is that the conjunctiva as the trephine twists round may be drawn under its edge and torn or cut. When that occurs it is, of course, serious. The safety of any operation depends upon the thoroughness with which you can protect the wound afterwards from the ingress of pathogenic organisms, and a torn conjunctiva may not cover the opening with safety. Not infrequently we find the conjunctiva in glaucomatous patients unduly brittle, and when that is the case it is very apt to tear even when carefully handled. It is a matter of vital importance to keep the flap as entire as possible throughout all the stages of the operation."

A Bowman's trephine three millimeters in diameter was used. "In the main I prefer to operate without a general anesthetic. A few drops of alvatunder put below the conjunctiva render the preliminary stages of the operation perfectly painless. As it proceeds the patient winces, and that at once indicates that you are through the sclera and that it is time to withdraw the trephine and examine the orifice made. If it has been well made the piece of sclera should be cut circularly round. Sometimes it is found that it is not so, but that at one place the trephine has completely divided the scleral tissue while it has not done so at another. In such cases it is generally possible to seize the little piece with a pair of iris forceps and to complete its excision by means of a pair of iris scissors.

"In this first operation I made the opening where I have continued always to make it, namely, at the corneoscleral margin. I dissect up the conjunctiva carefully, but very thoroughly, right to its insertion in the cornea, and the wound made by the trephine is placed as close to the cornea as it can be without involving the strands of the conjunctiva which are connected with the cornea.

"In view of the important facts brought to light by Mr. Thomson Henderson as regards excretion from the eye, I have thought it right occasionally to modify the operation by combining with it a thorough freeing of the angle of the anterior chamber in the neighborhood of the operation. For that purpose I take an ordinary repositor and pass it in, keeping the point in close contact with the sclera, till I see the point in the anterior chamber. I then move it about from side to side to a slight extent and in this manner free the tissues considerably.

"But an objection has sometimes been raised to my operation, and that is, that it is done right over the ciliary body. There still seems to linger in the minds of some operators that the ciliary body is essentially a vital part, the touching of which in an operation may bring on sympathetic ophthalmitis. No doubt the ciliary body is an immensely important structure. On it depends the power of accommodation, and also on it, there is reason to believe, depends the whole of the nutrition of the vitreous humor and of the lens. It is further admitted that it is highly vascular, and probably the opinion is quite just that it is very absorbent. But, on the other hand, it will not absorb anything if there is nothing to absorb. I quite admit that inflammation of the ciliary body in any form is a particularly undesirable condition; I may put it in stronger language and say a somewhat dangerous condition.

"Following an operation there will be no inflammation of the ciliary body in the absence of microorganic life. Moreover, if my operation be successfully performed it does not involve the ciliary body at all; it lays it bare, and it is quite true that septic material may be absorbed. Herein lies, so far as I know, the chief danger of the operation. The covering of the conjunctiva is an extremely thin one at the corneal margin, and there is a chance, although perhaps not a very

great one, that even a considerable time after the operation septic absorption may take place. In one of my cases there was panophthalmitis, which set in four or five months after the patient had left the clinic. The patient had perfectly recovered and had been well for several months. I think that in all such operations there is perhaps the danger that in after years septic absorption may take place. Possibly this danger might be reduced to a minimum by making the opening a little further away from the cornea, for in that situation not only is the conjunctiva thicker, but there is the thorough protection which is afforded by the capsule of Tenon." (To be continued.)

N. M. B.

A Method of Artificial Maturation of Cataract Allowing of Early Extraction.

CLEGG, J. G. (*Ophthalmic Review*, June, 1915). The pupil is dilated with atropin for one or two days before the operation. A paracentesis of the anterior chamber is made by an iris knife at the outer side. The aqueous is allowed to escape, an iris repositor is passed into the anterior chamber, and massage is applied directly to the lens capsule by it, taking care, however, that the capsule itself is not ruptured. Some twenty strokings of the lens capsule are made. After this further massage is made with the smooth lens scoop applied to the outer surface of the cornea. The movements are made in a rapid way radially from the center and backwards. One drop of atropin is instilled and a bandage applied. During the same day atropin solution is instilled again once, twice or thrice, according to the size of the pupil, and if the next morning the eye is perfectly quiet no further atropin need be used. Very commonly within two or three days definite opacification of the cortical layers of the lens is observable, and in several cases extraction has been proceeded with on the seventh day after the first operation. Extraction should not be resorted to, however, unless the pupil has recovered its mobility and is again of the ordinary size, and unless there is absolutely no sign of irritability, the result of the massage operation.

This method allows a business man, who is becoming incapacitated for his work, to have maturation and extraction done and recovery to take place within the shortest possible space of time. Under the most favorable circumstances he

need only be confined to the nursing home or hospital for three or three and a half weeks.

The advantage of having the cortical layers of the cataract opaque at the time of the extraction is obvious, in that the cortex is visible and soft, and thus can be more completely expressed. The less lens substance left behind the better, for it may set up iritis; and certainly a good visual result is more rapidly obtained if it is away. N. M. B.

A Case of Sarcoma of the Socket.

CLEGG, J. G. (*Ophthalmic Review*, June, 1915). A case of sarcoma of the orbit is reported in detail, which was removed together with orbital contents and in which no recurrence has taken place in five years. N. M. B.

Eye Symptoms in Kaposi's Disease, Xeroderma Pigmentosum.

CROSS, F. R. (*Ophthalmic Review*, July, 1915). The most marked changes are seen in the face. The mucocutaneous surfaces at the mouth and eyelids become thinned and shrinking or fissured with superficial ulcers, and the lips become white and mottled with red vascular spots; any of the pathologic changes earlier mentioned may occur. The ears and nose edges seem particularly liable to growths and ulceration, and, as the lids and surface of the eyeball are continuous with the skin of the face, they may also participate in any phase of the disease.

The pigmentation and thinning of the eyelids is associated with a dry and rough conjunctival surface and with shrunken eyelashes.

On the lid edges may occur warts, or inflamed papules like styes, which tend to ulcerate. Nodular swellings may grow on the skin surface of the eyelids and towards the caruncle.

The ocular conjunctiva is usually hyperemic, from a general congestive fullness of the vessels, or with acutely inflamed patches which often run to the edge of the cornea.

Some cases are said to have shown pterygium, but the nodules are probably more frequently allied to phlycten or pinguecula. The edge of the cornea seems particularly prone to implication—a patch of hyperemia simply, or complicated with swelling and deposition of cells which may absorb again,

or may form corneal ulcers, or else lead on to the formation of a neoplasm.

The cornea itself becomes hazy from infiltration of its substance, or from swelling of the epithelium. In these cases there is photophobia and blepharospasm.

Ectropion is frequently present, and leads to opacity or ulcer of the cornea; but in many of the cases that have been depicted—Crocker's and others—the eyes are open and the light seems to be well borne.

The optic nerve and the intraocular structures are probably not affected excepting as a late complication of more superficial lesions, and even iritis is probably seldom present unless the cornea has first become very deeply affected.

Although the cases cannot be cured, persistent treatment gives much relief. The discharge from the irritable conjunctiva or from ulcers must be constantly washed away by soothing antiseptic solutions, so as to avoid irritation and eczema of the neighboring skin.

The growths need to be repeatedly removed and eradicated and the ulcers scraped. The application of massage to the eyeball empties the superficial blood vessels and the swelling of the cornea. I have applied a calomel ointment with good results, and used it as a medium for massage. Cocain is comforting, but damages the corneal epithelium; atropin appears to aggravate the photophobia; and as iritis is probably not an early symptom, and rarely present until the eye is very seriously damaged, is not usually needed. Colored veils and ointments may protect the skin.

Dr. Whitfield has much improved one of the patients mentioned by the application of X-rays. N. M. B.

Injuries to the Eye in Warfare.

ORMOND, A. W. (*Ophthalmic Review*, August, 1915). Under the above title are described three cases of traumatic amblyopia following the explosion of shells.

One case of loss of sight of right eye, owing to bullet passing through orbit.

One case is reported of a soldier fighting in the ranks with double buphthalmus, his vision in each eye being 6/60.

Twenty-eight cases of soldiers blinded in battle. Ten of these men have no perception of light at all, and the sight of

those who have vision ranges from a mere perception of light to the counting of fingers in one part of their field. Twenty-one were the victims of bullet wounds which for the most part traversed the front part of the head from side to side; four were wounded by shrapnel, one by a hand grenade, and the rest by explosion, the exact nature of which the men themselves are unable to give; one, however, was due to a bullet hitting the magazine of the man's own rifle which exploded in his face. One remarks the extraordinary malignancy of these indirect bullet wounds of the eyes; several of the men when looked at now appear to be absolutely fit, often with both eyes intact and having a natural appearance, and the scar of the entrance and exit wounds are almost impossible to locate. Sir Victor Horsley states that the severity of bullet wounds is proportional to (1) the sectional area of the bullet, (2) its velocity, (3) the amount of fluid present in the medium through which the bullet travels; this last factor, I think, accounts for the extreme disorganization of the globe found in many cases in which the eye has not been hit directly at all; the greater part of the vitreous chamber being occupied with soft glistening white masses of organized blood clot; in part showing also some red coloration and often entirely masking all details of the fundus. In a few cases the optic nerves themselves have been severed, and in others definite rupture of the choroid and the retina can be made out.

"Of all the cases of injuries to the eyes that I have seen, including a large number in which one eye only is damaged, I have only had one case in which detachment of the retina was probably present. I have also only had one case of cataract, which is, I think, remarkable, considering the number of cases of injury to the eye both direct and indirect which have been seen. To those of us who are working in base hospitals it is a matter of the greatest regret that we are unable to do anything to improve the vision of these blinded men, the damage is so extensive and of such a nature that it precludes any hope of improvement. A great deal of work has of course been expended in cleaning up the wounds and curing septic discharges, which in some cases were very profuse, but the main work of the surgeon is now to devise plastic operations to diminish the disfigurement and to enable the men to wear artificial eyes.

The psychology of these men who have been blinded is very interesting; with only two exceptions, and of these one is probably the result of damage to the frontal lobe, all of them exhibit extraordinary cheerfulness and contentment.

One case of ulcer of the cornea. Amongst the cases that have been sent to me from among the men training in and around London, I have seen about half a dozen cases of miner's nystagmus, which had apparently been previously cured but which had redeveloped under the strain of training; these men have all been considered unfit for foreign service. Two cases of retinitis pigmentosa with well marked pigmentary changes in the fundus have also come to me; these are quite unfit for either home or foreign service.

I have only had one case of deliberate malingering which was very easily detected, but a large number of men are inclined to exaggerate existing defects and require some reassuring that matters are not as serious as they would like one to believe. On the other hand, it is pleasant to record that many men have given in their ages as anything from thirty-five to thirty-nine years whom I have found from their inability to see to read, notwithstanding the excellence of their distant vision, to be at least fifty years of age, but whose keenness and fitness make them in every way desirable soldiers."

A table is appended giving in abstract the nature of the wound, vision and remarks of twenty-eight cases.

N. M. B.

The Diagnosis of Glaucoma.

ELLIOT, R. H. (*Ophthalmic Review*, September, 1915). Comment is made upon the cases of glaucoma which are not recognized by the general practitioner, and the question asked: "Is glaucoma, after all, a condition whose manifestations are so subtle and recondite as to require for its correct diagnosis the skill and experience of a highly trained specialist?" There are undoubtedly cases to be met with in which the most careful discrimination is demanded, cases which patient, prolonged observation alone will unravel, and on whose diagnosis able and experienced surgeons may reasonably differ. No one will dispute their existence, but they are few and far between. In the great majority of instances the diagnosis of glaucoma is written large for any medical man to read. So much so that at first sight a mistake would appear

to be unpardonable, until we remember the conditions under which the modern medical practitioner works.

Modern surgical methods have revolutionized the treatment of glaucoma, and have made it possible to save a patient's sight, always provided that a diagnosis is arrived at sufficiently early. It is, therefore, all the more regrettable when a surgeon fails to recognize without delay the evidence of increased intraocular pressure, and so lessens the chance of a successful issue to the case. There are very few diseases which are more easily diagnosed than an ordinary attack of congested glaucoma, and there is certainly no surgical emergency which is more susceptible to early, active and suitable therapeutic treatment; whilst the modern operations have made the surgical treatment of increased intraocular pressure both safe and certain, so far as surgical procedures can ever be said to be either. As for noncongestive glaucoma, if the medical men makes it a rule to think invariably of high tension as a possible explanation of every case of failure of vision, and to keep that possibility in his mind until a careful examination has ruled it out, he will not have to reproach himself with lamentable mistakes such as we have been discussing.

The writer divides the stages of glaucoma into (1) early glaucoma, (2) established glaucoma, and (3) late glaucoma, considering that drawing a distinction between the so-called prodromata of glaucoma and the attack itself a wrong one.

Once an eye shows signs of glaucoma, even though those signs are nothing more than the rainbows round lights, transient mists, or the lightning-like flashes, which we have been taught to call prodromal symptoms, that eye is definitely glaucomatous, and to hold any other opinion is to bury one's head in the sand.

The necessity is dwelt upon having formed in our minds a clear comprehension, not only of the clinical differences between congestive and noncongestive or simple glaucoma, but also of the widely different conditions which determine whether or not the vascular factor shall or shall not enter into and dominate any particular case. The radical distinction between the two states lies in the fact that in the former the changes which bring about the rise in tension have been slowly developed, or else the previously existing anatomic

conditions have been such as to oppose any sudden interference with the vascular circulation of the eye taking place, or to compensate for it if it does occur. The ocular blood vessels have, therefore, had time given them to adapt themselves to their new morbid environment. The conditions present have been aptly likened to those which are found in abdominal hernia, with and without strangulation. The comparison seems to present some very interesting analogies.

The influence of vasomotor changes will be here fully as great as we have seen it to be in the case of hernia; for we have to do with the many conditions which directly affect the blood supply of the head, not forgetting anger, grief and various other forms of mental excitement; and we have also to take account of all those influences, such as bodily and mental fatigue, which act unfavorably on the whole vascular system, thereby tending to establish conditions which will hamper the normal escape of blood from the tissues. It thus comes about that a case of noncongestive glaucoma may, at any time and with very little warning, pass over into a congestive condition, whilst under favorable circumstances the opposite and happier change may and not infrequently does occur. The writer maintains the clinical distinction between congestive and noncongestive glaucoma is not a radical one, as it depends upon conditions which may at any time alter and which in so doing will profoundly modify the clinical course of the case.

The elements of a case of glaucoma as the writer sees them are (1) that the disease is relentless and progressive, (2) that its keystone is a rise of pressure within the eye, (3) that the fundamental causes of this rise are protean, (4) that one and all of them act fundamentally by upsetting the balance between the secretion and excretion of the intraocular fluid, and (5) that the entry of the vascular factor into the drama is an accident, though one of the very gravest proportions. If these facts are clearly appreciated, the great variety in the clinical course of the disease will be more easily understood. Then follows a detailed description of the clinical course of an attack of simple glaucoma, followed by a description of a case of primary congestive glaucoma which should be read in the original. (To be continued.)

N. M. B.

Unusual Distribution of the Diplobacillus Liquefaciens of Petit.

TAYLOR, F. E. (*Ophthalmic Review*, September, 1915). Although the presence of the diplobacillus of Morax-Axenfeld in the nose has been recorded by many observers (Bland, Erdmann, Treacher Collins, and Gifford), yet the presence of the closely allied organism, the diplobacillus of Petit, in the same situation has not hitherto been recorded, nor, so far as he is aware, has either of these organisms been previously found in the throat.

A case is reported. The writer's reading of this case is that the pharyngitis was a staphylococcal infection, and that the diplobacilli were not the causal organisms, seeing that they persisted in the throat after the pharyngitis had cleared up.

It may also be pointed out how readily the diplobacilli were banished from the throat after a zinc sulphate gargle had been given, and how persistently they remained in the nose, probably owing to the difficulty encountered by the patient in himself performing the nasal irrigation.

With the absence of the diplobacilli from the conjunctival sac, their ready disappearance from the throat, and their persistence in the nasal cavities possessed of healthy mucous membranes, we may conclude that this patient is a chronic nasal carrier of the diplobacillus of Petit, and that the organisms obtained from the throat were derived from this source.

N. M. B.

Speedy Enucleation of the Eye.

McMILLAN, J. F. (*Lancet*, February 6, 1915). "The patient having been anesthetized, I affixed the stop spring speculum and with a hook drew forward and depressed the eyeball, when I was struck by the cramped position of the parts; and so, after having cut around the conjunctiva above the horizontal equator with a scissors, I punctured the ball and allowed the vitreous to escape. Then, with ease and speed the muscles of the eye were severed; the membranes of the ball were divided at the longitudinal equator, and next carefully trimmed to an eighth of an inch around the optic nerve. There was little or no hemorrhage. A pad of boracic wool was inserted and bandage applied. The next morning the wound had almost completely healed by first intention.

Celerity here was the main point. As regards the danger

of sympathetic ophthalmia, the risk would appear a minimum one, though one would view with caution any tampering with the optic nerve. Let us suppose that the wound does not unite by first intention, as is possible under the conditions of warfare, then it would appear obvious that there is less likelihood of inflammation of the stump than if the optic nerve had been severed."

N. M. B.

Lipemia Retinalis.

MOORE, R. F. (*Lancet*, February 20, 1915). Two cases are reported occurring in diabetes in young people, twenty-three and twenty-five years of age. The ophthalmoscopic appearance is described and mention made of results in experimental lipemia. Result of examination of the blood by Dr. Shore is appended. The author concludes: "Lipemia retinalis occurs in young diabetics who are usually bordering on coma, and it consequently implies an immediately grave prognosis, but recovery from the condition may occur. It implies a high degree of lipemia, and it is probable that in no condition other than diabetes does lipemia attain a sufficiently high degree to give rise to the appearances of lipemia retinalis. The conspicuous changes in color and appearance of the retinal vessels are probably entirely dependent upon the opacity of the plasma, and do not indicate a change in the hemoglobin. Lipemia retinalis supplies so striking and characteristic an ophthalmoscopic picture that it cannot be overlooked nor mistaken for any other condition."

N. M. B.

Psychology of Traumatic Amblyopia Following Explosion of Shells.

PARSONS, J. H. (*Lancet*, April 3, 1915). "Ophthalmologists have become familiar recently with cases of amaurosis and amblyopia resulting from the shock of the explosion of shells at the front. In many cases direct injury of such a nature as to cause definite organic lesion in the eye or visual paths can be eliminated. The earlier symptoms, which I have not personally observed, have been described and investigated by Dr. C. S. Myers, F. R. S. The history of a typical case is briefly as follows:

"A man after more or less prolonged fatigue, induced by marching and exposure in the trenches, is incapacitated by the explosion of a shell in his immediate vicinity. He may

be merely knocked down or thrown into the air, and more or less seriously injured or wounded by concussion, shrapnel bullets, or shell splinters. Consciousness is lost for a variable time, but often not so far as to prevent automatic movements, so that the man may walk in a dazed condition to a dressing station. The mental equilibrium at this stage is much disturbed, and all memory of this phase is usually lost. The most striking feature of the case is that the man is instantaneously struck blind. The blindness may be associated with deafness, loss of smell and loss of taste, but all these are less frequent than the blindness. On examination it is found that there are intense blepharospasm and lacrimation.

"The lids are opened with great difficulty and examination of the eyes is almost impossible. The author is not aware of any record of the condition of the pupils at this stage. In the course of a week or two the blepharospasm diminishes and it becomes possible to examine the fundi. Of course, there may be local injury to the eye, but in uncomplicated cases the eyes are found to be normal. The pupils react to light, though in some cases the reactions are sluggish, and sometimes one pupil differs from the other, being larger, or more sluggish in its reactions. The fundi appear to be absolutely normal. By this time probably some restoration of sight has occurred. Light is perceived and large objects may be distinguished. As improvement occurs the patient manages to grope about, usually with his hands outstretched before him, and it is noteworthy that he does not usually stumble up against objects in his path. As soon as it is possible to take the fields of vision it is found that they are markedly contracted, and that indeed to a degree which seems scarcely consistent with the avoidance of obstacles in walking.

"The recovery of vision is slow, but eventually it seems always to be complete. In the later stages I have had cases in which the right eye is more affected and recovers more slowly than the left. It may recover to the extent of having only a central scotoma, though this may reduce the visual acuity to 6/60 or less. By perseverance and encouragement the patient may be induced to read a few lines of the types, and I have had cases where the manipulation of weak plus and minus lenses has led to the full 6/6 being read.

"There are several suspicious symptoms in many such cases.

The eye to recover last is often the shooting eye. Some patients show an obvious disinclination to return to duty. Some candidly admit to being in a 'blue funk.' In all there has been a complete mental upset, sometimes accompanied by hysteric symptoms—outbursts of weeping, etc., in the early stages. These features render it only too easy to jump to the conclusion that there is often a large element of shamming in the case. It is because there is very grave danger of cruel injustice being done to men who have faced the music and come battered out of the ordeal that Parsons attempts to an explanation of the underlying psychology.

"In the first place it is necessary to segregate these cases from allied conditions due to organic lesions or to malingering. It is not always easy to eliminate organic lesions of the type which causes so-called retrobulbar neuritis. It is still less easy to eliminate malingering, but as this depends upon a knowledge of the psychology of the individual, it forms a prime object of the following discussion. Since there is no demonstrable organic lesion these cases may be regarded as examples of injuries or wounds of consciousness. This does not imply that there is no neural lesion to account for the psychologic disorder, but merely that it has hitherto escaped observation. Parsons adopts the view of parallelism between physiologic neural processes and psychologic events or changes in consciousness.

"As regards the type to which the group under consideration belongs, it may be admitted that the disorder of the conscious processes varies with the nature and severity of the injury, and with the organization of the individual's character. Of these the latter is by far the more complex, and in order to make my meaning clear it will be necessary as briefly as possible to sketch the evolution of character."

Then follows a brief sketch of the deductions of Morgan, Baldwin and MacDougall on mental evolution, which cannot be abstracted.

"In the case of a soldier under shell fire the man is usually bodily fatigued, whereby his control is impaired. He has 'the fear of death before his eyes' and is in a state of acute excitement, whereby his normal judgment is impaired. These conditions conspire to give his innate instincts ungoverned play. On the other hand, positive self-feeling, aided by sug-

gestion and imitation and the sentiments of patriotism, the honor of the regiment, his own honor and so on, enforce his volitional control. At last, however, the shock comes which strikes him unconscious. It is not to be supposed that he is thereby anesthetized to these emotional storms. It is rather to be conjectured that he is rendered 'subconscious,' and hence the more a victim of his lower instincts. This view is supported by the emotional behavior of the men in the early stages, and by the fact that many of their actions can be revived by hypnosis.

"The unconsciousness in these cases is to be explained physiologically by an abrogation of the functions of the highest level cortical cells. Recovery shows that the cells are not irretrievably damaged, and it is most likely that the block occurs on the afferent paths at the synapses of these cortical cells. Consciousness returns, but there is blindness. So far as objective evidence goes, the lower visual paths are intact and function normally. The optic nerves carry their impulses, at any rate, as far as the pupil reactions are concerned. The condition resembles uremic amaurosis. Parsons has seen it also in children after post basic meningitis. The block is somewhere above the so-called primary optic centers—external geniculate bodies, optic thalami and superior colliculi. It, too, is probably in the synapses of the cortical cells, in this case the synapses of the fibers of the optic radiations. Sometimes such a block occurs physiologically and it is probably to be explained in the same manner.

"Though in the cases under special consideration there can be little doubt that the early loss of vision has a definite neural basis, it must, I think, be conceded that in the later stages the neural basis is of that undefined nature which we associate with so-called (functional) conditions. In other words, it is neurotic, but it is not 'shamming.'"

The treatment consists largely in attempting to stimulate volitional control of the various emotions by suggestion, active sympathy, etc. As regards therapeutic measures, it should be remembered that fright causes great exhaustion of the suprarenal glands. N. M. B.

The Scotoma of Migraine.

EDRIDGE-GREEN, F. W. (*Lancet*, April 24, 1915). The writer states it is always interesting to show that some patho-

logic phenomenon is explained by some simple disturbance of a physiologic process. Edridge-Green has shown that the foveal region of the retina which contains only cones is sensitized from the peripheral portions containing rods, and describes how this can be illustrated by directing the eyes toward a white ceiling on awakening in the morning, when the central portion of the field of vision appears as a black spot, and light appears to invade this spot from without inward. On closing the eye again a bluish violet circle appears at the periphery or middle of the field of vision, contracts, and then, after breaking up into a star-shaped figure and becoming brighter, disappears, to be followed by another contracting circle. If the eye be opened when the star figure has formed in the center, it will appear as a bright rose colored star, much brighter than any other part of the field of vision. If, however, we wait until the star has broken up and disappeared before opening the eye, it will be found that only a black spot is seen in the center. Edridge-Green regards these circles as due to the circulation of photochemic fluid sensitized by the visual purple over the ends of the cones. It will be seen, therefore, that if there be any disturbance of the circulation of the eye so that this flow of photochemic fluid to the fovea be interrupted, we should have a central scotoma increasing from within outwards. This is the phenomenon which is experienced in migraine.

N. M. B.

Some Aspects of the Ciliary Body in Health and Disease.

DUNN, H. P. (*Lancet*, May 29, 1915). The writer states in conclusion the main purport of this paper is to lay stress upon hypothyroidism as a causative factor in cases of iridocyclitis and on the usefulness, clinically, of its recognition. That the ciliary body, so sensitive to toxic influence, should readily respond to thyroid treatment is a natural sequence to the vascularity of its structure. Thus is placed in the hands of the ophthalmic surgeon a means of relief, yielding results which can be obtained in no other way. The dose of the extract employed by Dunn for children beyond five years of age and for adults is three grains twice daily, and from this dosage he has never seen any ill effects.

N. M. B.

Penetrating Injury to the Eye From Broken Spectacle Glass.

STEPHENSON, S. (*Lancet*, July 10, 1915). Injuries to the eye by broken spectacle lenses are admittedly rare. Hans Lauber, among one hundred and fifty thousand ophthalmic patients, found five (or one in thirty thousand) who had sustained this kind of accident. Such accidents, as a rule, are of a description to which people are exposed but exceptionally. For example, in the five cases related by Lauber the injury resulted from a railway collision, the explosion of an acetylene lamp, a knock against a metal wardrobe number, a blow from a ball, and an injury from an animal's hoof. It has even been suggested that glasses may sometimes protect the eyes from injury, either by diminishing the force of a blow or by changing its original direction. A case is known, indeed, where a chip of metal weighing six thousand and twenty milligrams had shattered the glasses but left the eye beneath intact (Hirschberg). Lauber believes that spectacles are, speaking generally, more dangerous than eyeglasses, inasmuch as the latter drop off more readily than the former. The question as between framed and rimless spectacles or eyeglasses is more difficult to decide, since those most exposed to injuries seldom wear the rimless forms. Of the ten cases of injury to the eye by broken lenses, one was a child, one in an old man, and the remainder in young men. The case in his practice, now related, is the only one where the accident occurred to a woman.

N. M. B.

Two Cases of Traumatic Double Hemianopsia With Partial Recovery.

MILNER, C. E. H. (*Lancet*, July 24, 1915). The essential features presented by the two cases are as follows: The occurrence in both of bullet wounds in the occipital region, immediately followed by complete blindness, and of subsequent recovery of vision except in one direction, which has been identical in both—the left lower quadrant of the visual field. And perhaps the chief interest is a psychoanatomic one, namely, a consideration of the question why there existed a condition of total blindness and why there has been recovery.

As to the etiology of the condition present in both cases, one of double complete hemianopsia passing into double quad-

rantic hemianopsia, there are two possible solutions. In both cases there was certainly some actual damage done—i. e., some (probably permanent) injury to the lower part of the cuneus on the mesial surface of the right occipital lobe. Such damage would readily account for the persistent quadrantic hemianopsia. It is for the other condition, that of transient double complete hemianopsia, of temporary total blindness, that there are two possible solutions. On the one hand this may have been caused by hemorrhage at the moment of the wound, by blood effused along the mesial aspect of the occipital lobes, which by pressure caused immediate total blindness, and later became organized into a small clot. And on the other hand it may be due, as suggested by Major F. W. Mott, R. A. M. C. (T.), to a profound but passing shock effect which made itself felt also in the opposite occipital lobe, and for the time being paralyzed the function of the entire visuosensory apparatus.

N. M. B.

Postoperative Insanity With Special Reference to Ophthalmic Cases.

PFINGST, ADOLPH O. (*The Jour. of Ophthalmology and Oto-Laryngology*, June, 1915), says that no form of derangement can be considered characteristic of the insanity following surgical procedures. All authors agree, however, that in most of these cases there is a predisposition, either hereditary or acquired. The earlier authors attributed these mental disturbances to the shock incident to the operation. Later the hypothesis was advanced that the nervous system was poisoned by the anesthetic or by the antiseptic agents employed. Iodoform was thought by the advocates of this theory to be especially prone to bring on psychoses. Other supposed causes were the loss of blood, disturbed intracranial circulation due to the anesthetic, alcoholism, sudden abstinence from alcohol, and syphilis.

Only in late years has attention been called to the relation of diseased blood vessels and kidneys to the psychic disturbance. Most psychologists agree that disturbed mentality rarely occurs in the aged except in the presence of arteriosclerosis and usually of diseased kidneys, and that the blood supply to the brain is lessened by reason of the hardened arteries. It is believed that the operation acts merely as a

determining factor in a subject already predisposed by a mental exhaustion and lessened power of resistance. The belief is growing that the derangement never occurs except in individuals with a predisposed mental instability.

Mental disturbances follow operations upon the eye more frequently than they do operations upon other parts of the body. Next in frequency they follow gynecologic operations and operations upon the genital organs. They may occur after operations or injuries of any part of the body. Just why ophthalmic and gynecologic operations and surgery of the genital organs should favor the development of psychoses has not been explained. Apprehension about the organs of sight and reproduction, and the modesty regarding the female organs, may be looked upon as the explanation. The severity of the operation does not stand in any causative relation with the development of psychoses. The frequency of postoperative psychoses is yet in doubt. In a total of 45,000 surgical cases of seven Louisville surgeons, insanity was observed eighteen times, or once in 2,500 cases. The nature of postoperative mental disturbance differs, though most cases have been classified by psychologists as "acute hallucinatory or confusional insanity." These patients become more or less delirious, the most frequent symptoms of which are hallucinations, usually ocular or aural, and the resulting delusions. They usually suffer with restlessness, insomnia, depression and a change in disposition. In more marked cases there is a decided confusion of intellect. These subjects pass into a state known as disorientation.

In point of frequency acute mania stands next to the acute confusional insanity as a complication of surgery. The maniacal symptoms may be followed by symptoms of melancholia. These cases are characterized by marked mental depression, a desire to avoid people and delusion of fear or trouble or of sin. These cases usually have the delusion of being persecuted, and many of them have suicidal tendencies. In most of these cases of postoperative insanity the symptoms occur from the second to the tenth day. Rarely the symptoms appear a few hours after the operation. The duration of the psychic disturbance also varies from several days in the milder forms to several weeks in the more severe cases. Exceptionally the derangement lasts for several years, some

passing into the chronic state of a paranoiac. Statistics indicate that most of the cases of confusional insanity recover, while from forty to fifty per cent of cases which show symptoms of mania or melancholia remain permanently deranged or die as a result of the psychic disturbance.

The treatment is primarily prophylactic; the patient's mind should be got into as tranquil a condition as possible. He should have full confidence in the surgeon, his surroundings should be quiet and pleasant, and if addicted to alcohol or drugs, these should not be withheld.

It was thought that cases of delirium following operations upon the eye were due almost entirely to the long confinement in dark rooms; however, experience has shown that cases kept in light rooms without bandages develop psychoses, though less frequently than when confined to dark rooms.

Individuals with unstable nervous systems have been improved by successful cataract operations.

Contrary to what has been said of surgical operations elsewhere, the nature of the ophthalmic operation does influence the frequency of postoperative psychosis, case reports showing that with but few exceptions they follow the operation for senile cataract.

The nature of the psychic disturbance following operations upon the eye does not differ from that described following operations upon other parts of the body.

Herman Knapp reported two cases of postoperative insanity in over ten thousand operations, of which two thousand were cataract operations. The author draws the following conclusions:

1. Postoperative insanity does not occur in individuals mentally sound.

2. The cases nearly all occur in senile subjects and in younger subjects with atheromatous blood vessels or diseased kidneys.

3. The most probable cause of the predisposition lies in an atheromatous condition of the blood vessels or in diseased kidneys with resulting intoxication; hence, these cases are more properly senile or toxic insanities than postoperative or dark room deliria.

4. All cases of mental aberration associated with halluci-

nation, etc., even though they be of short duration, may be looked upon as cases of true insanity.

5. Psychoses may occur after any kind of operation, but they are especially prone to follow operations upon the genitals and the eyes, and more especially cataract operations.

6. Insanity occurs perhaps once in every four hundred to six hundred cases of surgery, including ophthalmic surgery, and it occurs once in about every two hundred or three hundred cases of cataract extraction.

7. Psychoses following ophthalmic surgery do not differ materially from those following general surgery.

8. Many cases are of brief duration, but some may last months or years, or the patients may even become permanently insane. A small percentage die as a result of the nervous affection.

E. C. E

ABSTRACTS FROM GERMAN OPHTHALMIC LITERATURE.

BY

ALBERT C. SAUTTER, M. D.,

PHILADELPHIA.

MAX W. JACOBS, M. D.,

ST. LOUIS.

J. W. CHARLES, M. D.,

ST. LOUIS.

EUGENE J. BRIBACH, M. D.,

ATCHISON.

The Effect of Continued Subconjunctival Injections of Supra- renal Preparations in the Rabbit and Their Therapeutic Application in Man.

ERDMANN, P. (*Zeitschr. f. Augenh.*, September-October, 1914). Subconjunctival injections of adrenal preparations act in two ways on the eye of the rabbit, causing dilatation of the pupil and a constriction of the vessels of the anterior portion of the uveal tract. The mydriasis begins in a few minutes and reaches its maximum in fifteen to twenty minutes. According to Wessely, it takes place by direct action on the muscles of the dilatator.

Wessely assumed the vasoconstrictor action by the absence of the Ehrlich line after intravenous injection of fluorescein and the failure of the albumin content of the aqueous to increase after subconjunctival injection of salt solution. In addition, the temporary diminution of the intraocular pressure may be attributed to vasoconstriction of the ciliary vessels.

The duration of the daily injections was from forty-six to seventy-two days, with controls of physiologic salt in the animal's other eye. Postmortem, there were seen the well known plaques in the ascending aorta designated by B. Fischer as adrenalin arterionecrosis. There were no general changes except an atrophy of the musculature and heart.

Comparing the eyes injected with the adrenal preparation with the controls injected with salt, the former showed inflam-

matory changes (adhesion of conjunctiva to sclera, etc.). There were no other changes in the eye. No vascular changes were visible. He concludes that the long continued injection of adrenalin causes no important injury to the rabbit's eye. Erdmann then gives a résumé of his results in disease. In iritis from whatever source, he believes that he has obtained a more marked mydriasis by the subconjunctival use of these preparations, supplementing the usual atropin, also atropin and cocain, solutions, than with these alone, apparently demonstrated by the yielding of synechiæ which had resisted the mydriatics alone. Violent corneal inflammations have also seemed to improve under their use.

Erdmann suggests that in consequence of the increase of albuminous content in the aqueous after subconjunctival injections, there is probably an increase of antibodies in infectious iritides which would exert a favorable influence.

He has seen no unfavorable results, but warns against possible fresh hemorrhage in acute hemorrhagic iritis after the vasoconstrictor effect has passed away.

In a case of parenchymatous keratitis with iridocyclitis and increased tension he had no trouble, and the tension fell to normal after the first injection. But in glaucoma the subsequent increase of tension would preclude its use in most cases; still with renoform he reduced tension in *one* case of glaucoma simplex, with tension of twenty-one millimeters Hg. to eighteen millimeters after forty minutes, fifteen millimeters after twenty-four hours and to twenty millimeters after forty-eight hours.

In another case of glaucoma simplex he used renoform in the left eye (tension, eighteen millimeters) and paranephrin in the right (tension, twenty-one millimeters). After four hours left eye tension was fourteen millimeters, right eye tension was fifteen millimeters. After sixteen hours left eye tension was fourteen millimeters, right eye tension was fourteen millimeters, and in twenty-four hours left eye tension was eighteen millimeters, right eye tension was twenty-one millimeters.

He has recently added these preparations to his subconjunctival salt injections in the complications of high myopia, exudates in the fundus, vitreous, etc., in the hope of encouraging metabolic changes; also to subconjunctival dionin injections, always excepting cases of intraocular hemorrhage.

The reviewer can hardly accept his reasoning in the latter instance, since the outward expression of the effect of the dionin is the edema which is much diminished by the instillation of adrenalin, and one would expect metabolic changes to be diminished also.

J. W. C.

Necrosis of the Lids.

EPPENSTEIN, ARTHUR (*Zeitschr. f. Augenh.*, July, 1914), reports three cases from Bielchowsky's clinic. From the first case he made cultures of staphylococcus albus; from the second, streptococcus; and from the third, staphylococcus aureus and the xerosis bacillus.

In nine cases of lid necrosis, staphylococcus aureus was found four times, once combined with streptococcus and once with lues; streptococcus was found five times, and once combined with staphylococcus aureus.

J. W. C.

The Etiology of Keratoconus (Examination by Means of the Abderhalden Dialysis Method).

HIPPEL, V. (*Klin. Monatsbl. f. Augenheilk.*, September, 1913), found disturbances in the metabolism of the glands concerned in internal secretion in two typical cases of keratoconus and in another corneal condition closely allied to this disease. By the dialysis methods of Abderhalden the thymus was found involved in all cases and in one instance solely. In two cases the adrenals gave a strongly positive reaction, while in one instance the thyroid gave a negative reaction, a doubtful reaction in the second and a weakly positive in the third. Although, according to Kolb as well as Lampé and Papazolu, a positive reaction signifies a disfunction and not a simple hypertrophy of the thymus, v. Hippel cautions against any acceptance of his or their findings until more work along these lines has been done. He calls attention to the fact that such patients do not always give the same reaction and that in keratoconus of long standing this may be especially true.

M. W. J.

The Etiology of Keratoconus.

BEHR (*Klin. Monatsbl. f. Augenheilk.*, September, 1913) describes this condition in a patient who showed primary thinning of the sclera and primary habitual luxations in different joints. The occurrence of these three rather rare conditions in the same individual speaks for a common internal

cause, especially since the same tissues are involved. Only a germinal predisposition could be the cause of such retardation in the development of the fibroelastic tissue. The demonstration of congenital changes in the tissues of the outer ocular coat where keratoconus is present satisfies the dictum of Salzmann, who stated that the presence of such changes would tend to prove that keratoconus is due to a disturbance of development. He suggests the possibility of two kinds of keratoconus. The one due to congenital changes which influence development, the other caused by acquired changes the symptoms of a dyscrasia. M. W. J.

Histologic Findings in Diplobacillus Ulcer of the Cornea.

LÖWENSTEIN (*Klin. Monatsbl. f. Augenheilk.*, September, 1913). In the depths of the ulcer the hyalin necrotic area described in pneumococcic ulcer was absent. This may be explained by the less virulent character of the products of metabolism of the diplobacillus. The leucocyte paths on the anterior surface of Bowman's membrane connect the superficial infiltrate and the masses of pus which it covers with the superficial network of vessels at the limbus. The deep infiltrates show similar paths leading from the deep limbal vessels. These findings, in view of the accepted idea that leucocytes cannot penetrate Bowman's membrane, show that these cells have wandered from the dilated vessels. Löwenstein found the diplobacilli remarkably well preserved in the corneal tissue in contrast to the pneumococcus, which is rapidly destroyed in corneal ulcers—probably by the products of its own metabolism. M. W. J.

Fluctuating Punctate Epithelial Opacities of the Cornea.

STREIFF (*Klin. Monatsbl. f. Augenheilk.*, September, 1913) reports a patient with faintly visible superficial epithelial opacities consisting of small groups of fine dark gray distinct points. These patches disappeared and reappeared at various points, and at intervals of not more than a few hours at the most. The patient was run down, and Streiff suggests the possibility of a functional disturbance in the cornea. He calls attention to the fact that Stern described a similar picture in a case of trigeminus anesthesia. Löhlein has suggested the similarity of this condition to urticaria or edema fugax

in chlorosis. Streiff therefore suggests the term kerato-exanthema micropunctatum, and assumes that an irritation or disturbance of sensibility of the fibers of the trigeminus plays a rôle in this affection. M. W. J.

Supplementary to the Paper on "Internal Scleral Rupture With Observations on Ring Abscess."

STÖLTING (*Klin. Monatsbl. f. Augenheilk.*, September, 1913) found histologic evidence to prove the theory advanced in his former publication that ring abscess occurs as the result of secondary destruction of Descemet's membrane following the occlusion by masses of cells of the usual channels leading to Schlemm's canal. M. W. J.

Rupture of the Membrane of Descemet With Partial Necrosis of the Cornea in a Gliomatous Eye.

BERGMEISTER, RUDOLF (*Zeitsch. f. Augenh.*, September-October, 1914). The three-year-old boy was seen first November 30, 1912. The left eye showed ciliary injection, cornea fairly clear, and slight hypopyon. In the middle of the posterior surface of the cornea there was a large white precipitate. The iris was atrophic. In its lower inner quadrant there was a small white spot. Numerous synechiæ and small white spots were at the pupillary margin. The lens was cataractous, the globe hard. Enucleation was refused. The right eye was normal.

On May 3, 1913, the right eye was injected, the cornea clear, iris structure distinct, the anterior chamber deep, numerous synechiæ, the lens transparent. There was no reflex from the fundus. The tension was normal.

In the left eye there were conjunctival and ciliary injection, the globe was enlarged so that the lids arched forward when closed. The cornea appeared broader at its base and hemispherically globular. Around the cornea were numerous intercalary ectasias, the anterior scleral segment thinned, the cornea cloudy and traversed by a few deep vessels.

The anterior chamber was filled by a milk white exudate. Tension elevated. Numerous occipital and cervical glands were enlarged. Wassermann and von Pirquet were negative.

The left eye was enucleated May 6, 1913. Its measurements were twenty-five millimeters transverse and twenty-

three millimeters anteroposterior diameter. The diagnosis of glioma exophytum was confirmed, probably originating from the region of the nerve. The choroid was not involved by the tumor cells, but was atrophic.

The corneal epithelium exhibited the usual glaucomatous changes. Bowman's membrane was normal. The superficial and middle layers showed cell proliferation. The central portions of the deep cornea were necrotic. The membrane of Descemet was extensively detached, not by extension of tumor cells advancing from the ciliary and intercalary zone toward the cornea, but on account of the tear and undermining of its edges by free tumor cells which had penetrated the cleft. He attributes the rupture to the greatly increased tension and enlargement of the cornea.

J. W. C.

Cataract Following Wasp Sting.

BAER (*Klin. Monatsbl. f. Augenheilk.*, September, 1913). A four-year-old child was stung two millimeters down and outward from the limbus of the right eye. Fourteen days later the site of injury was still very definitely visible, and the lens showed definite cataract formation when the pupil was well dilated. The opacity eight days later had involved the entire lens, and a linear extraction was done. The initial area of cloudiness remained behind in spite of repeated attempts at removal. Baer thinks that here, as in cases of cataract due to bee sting, the cataract is not a simple traumatic affair, but the result of both trauma and toxin introduced at the time of injury.

M. W. J.

Treatment of Luxation of the Lens.

ASK'S (*Klin. Monatsbl. f. Augenheilk.*, September, 1913) views regarding this condition are as follows: The intra-bulbarly luxated lens is extremely dangerous for the eye and when possible should be removed. His pathologic anatomic findings in subconjunctival luxation of the lens point in the majority of cases toward the advantages of early operation (when necessary enucleation, having in mind sympathetic ophthalmia; otherwise, routine removal of lens). This is in contradiction of the still prevalent view of Stellwag, Manz and Mackenzie, that the removal of the subconjunctival lens should be delayed to afford the scleral wound time to unite.

M. W. J.

Sympathetic Ophthalmia After Enucleation.

JAMPOLSKY, FANNIE (*Zeitschr. f. Augenh.*, September-October, 1914), reports seven cases in addition to one other from Fuchs' clinic published by him. These were summarized by her as follows:

No.	Age.	Manner of Injury.	Time Between Injury and Enucleation.	Interval Between Enucleation and Outbreak of Sympathetic Ophthalmia.	Result.
1.	7 years	Splinter of glass.	18 days	12 days	Fingers at 1 m.
2.	16 years	Splinter of iron.	30 days	28 days	Fingers at 1½ m.
3.	36 years	Explosion of siphon	63 days	8 days	Unknown
4.	18 years	Piece of lead.	29 days	38 days	6/5 (?)
5.	16 years	Bread-knife.	27 days	4 days	6/6
6.	40 years	Splinter of iron.	39 days	3 days	6/6
7.	7 years	Nail.	30 days	19 days	Good vision according to letter.
8.	27 years	Cow's horn.	37 days	4 days	Fingers at 2 m.

Sixty per cent of these cases thus resulted in good vision.

J. W. C.

A New Method for the Treatment of Dacryocystitis.

FORONI, CAMILLO (*Zeitschrift f. Augenh.*, September-October, 1914), was not satisfied with his results in twelve operations after the Toti method because—

1. The entire nasal duct and greater portion of the sac remain untouched and continue to secrete, while the nasal opening in the mucous membrane is reduced by regeneration of tissue so that often the abundant secretion has no outlet.

2. The displacement of the opening in the sac from that of the nasal mucous membrane by means of the bandage compression, and later the deep cicatrizing process, destroys the continuity of the new channel. The tendency of the regenerating nasal mucous membrane is to completely close the opening.

He obviated the first objection by the removal of the nasal duct and the sac except the outer wall into which the common duct of the canaliculi emptied.

He set aside the second objection by using a supporting thread introduced over the ligament and attached to the middle of the nose in the skin, designed to take the place of the detached ligament.

However, out of seven cases thus treated, two had relapses a year after the operation, probably caused by a closure of the nasal opening. In cases which do not demand immediate interference he washes out the sac for several days. His present procedure follows in these stages:

1. Anesthetization of the nasal mucous membrane and high tamponing of the cavity corresponding to the lacrimal sac.

2. Anesthetization of the conjunctiva, especially at the inner canthus, with novocain.

3. Dilatation of the puncta.

4. Expression of the contents of the sac, and irrigation with Anel's syringe.

5. Anesthetization of the sac and duct with novocain and adrenalin.

6. Slitting of the canaliculi (the lower first) and the outer wall of the sac through the outlet of the canaliculi with the Weber knife (sparing the caruncle).

7. Enlargement of the opening in the sac and cutting through the ligament with scissors, when necessary using the strabismus hook, which easily fixes the reflected or deep por-

tion of the ligament at the place where it is traversed by the canaliculi or their common duct. Its section or partial removal furnishes a wide unobstructed access to the sac.

8. The Weber knife is pushed to the floor of the nose.

9. The duct is incised through its entire wall to the bone in all directions, first laterally, then anteriorly, medially, etc. (stricturotomy).

10. A large Bowman sound is passed and left a short time in position.

11. The sound is removed and a drain of gauze, impregnated with 1/1,000 mercury cyanid is introduced, carrying it to the floor of the nose. It must also completely fill the sac.

The drain is changed daily until the sac does not secrete any more, the area returned to normal and the wound completely covered with epithelium—usually eight to fourteen days. He does not hesitate to pass a sharp curette lightly over the mucous membrane from time to time. J. W. C.

ABSTRACTS FROM SPANISH OPHTHALMIC LITERATURE.

BY

WILLIAM H. CRISP, M. D., OPH. D. (COLO.),

DENVER.

Hygienic Conditions of Artificial Illumination.

VERDERAU, L. (*Archivos de Oftalmologia*, April, 1915).

1. The characteristics of a good artificial illumination, as related to the organ of vision, are stated as follows:

In the composition of the light, those rays should abound whose wave length is between six hundred and twenty and five hundred and forty millimicrons, while the light should be poor in infrared and ultraviolet rays.

The intensity of illumination of the object should be of ten meter candles. The luminous intensity of the source of light should be constant for the eye. For some forms of work it is convenient to have the color of the light as much like that of the sun as possible. It is also convenient that the source of light should have a large surface.

It is desirable that the source of light should be surrounded by glass which cuts off the greater part of the short wave radiations (euphos, or other glass with a uranium or chromium base).

2. Considerations of general health relate to the production of carbon dioxide by every artificial source of light, with the exception of the incandescent electric lamp; the heat given off by the various illuminants; and the giving off of toxic gases by some illuminants.

Two Cases of Gonococcal Conjunctivitis Treated by Specific Serotherapy.

LEOZ ORTIN, GALO (*Archivos de Oftalmologia*, April, 1915). The two patients, a mother and her son, suffered from bilateral conjunctivitis of more than ordinary severity. The boy had also a gonococcal urethritis and orchitis. Mother and son were given respectively twenty-five and twenty cubic

centimeters of antigonococcic serum by injection beneath the skin of the abdomen. Both showed improvement ten hours later, but the mother's corneas had become ulcerated. The following morning the suppuration and palpebral edema had become much less, the boy's urethritis and orchitis being at the same time better. One more injection of serum, of fifteen cubic centimeters, was given to each patient, and a like third dose to the mother. From the fourth day of treatment progress toward recovery was steadily maintained. Two weeks from the beginning of treatment both patients were dismissed, the boy without any trace of the inflammation and the mother with two very superficial leucomata. Having in mind the usually fatal outcome of gonococcic conjunctivitis in adults, Leoz Ortin expresses the opinion that antigonococcic serum may be decidedly helpful in these cases; although he declares that we must continue, as heretofore, to employ nitrate of silver, permanganate douching, and other local measures.

Studies and Experiments in Keratoplasty.

LEOZ ORTIN, GALO (*Archivos de Oftalmologia*, May, 1915), describes first some experiments upon the rabbit's cornea which he made in accordance with the method adopted by Reinsinger—that is, cutting two corneal flaps which reach almost to the horizontal meridian above and below, leaving merely a narrow bridge of tissue which is attached at the limbus. Flaps thus made, and reunited with separate sutures, healed very readily and left only a slight infiltration. In other rabbits the cornea was divided and sutured in its entire circumference, the cutting being done step by step with iris scissors, and the sutures applied in pairs as the partial sections were made, so as to avoid the danger of hernia of the iris. Although an ulcer occasionally developed, these eyes all healed very satisfactorily, the ulcers resulting merely in slight leucomata.

In a further series of experiments the cornea was transplanted from the eye of one rabbit to that of another. In three of the animals, to overcome the difficulties associated with leaving the eye without corneal protection, the eye on to which cornea was to be grafted was sectioned in the manner first described above; that is, dividing the cornea along the greater part of each half of its circumference, so as to form

two large flaps held in place only by a narrow bridge. The cornea which was to serve as a graft was then applied to the eyeball over the sectioned cornea, and two sutures applied at opposite ends of the meridian corresponding to the undivided bridge, leaving one of the sutures loose for subsequent removal. The graft was then sutured throughout its circumference, the two ends of the bridge originally left on the receiving eye being cut through towards the completion of this procedure, and the first cornea being removed from beneath the graft. Vascularization was complete in about a month. In all three of the animals there was an epithelial exfoliation of the vertex of the cornea, but of no great significance, and at the end of forty days reabsorption had been frankly initiated, the corneas recovering their transparency, although sensibility was recovered much more slowly. At the time of writing one rabbit had died. In another, which had been operated upon thirty-six days earlier, the cornea was almost perfectly regular, and its vitality apparently assured, although it was somewhat opaline at the periphery and more opaque in the center, and the sensibility was still only marginal. In the third rabbit, which had been first operated upon, sensibility was well established over at least half of the graft, and in the same half the palpebral reflex was quick and energetic, and the transparency almost perfect.

The sutures used extended through the whole thickness of the cornea into the anterior chamber.

Late Expulsion of Intraocular Foreign Bodies.

MENACHO, MANUEL. (*Archivos de Oftalmologia*, May, 1915), has observed three cases of partial or complete spontaneous expulsion of intraocular foreign bodies. In all three the eye was penetrated by a fragment from a firearm cartridge. In the first case both eyes had been injured, the left becoming blind and the right recovering full vision. Three months after the accident a fragment of cartridge escaped from the right eye, after preliminary disturbances of sensation, but without inflammation. No further inconvenience was suffered as regards this eye. In the second case there was sclerocorneal rupture of the right eye with complete avulsion of the iris and hernia of the vitreous. Six months after the accident a piece of metal measuring twelve by nine

and one-half millimeters presented at the corneal scar. Its extraction proved impossible and the eye was enucleated. In the third case an irregular fragment of metal weighing four milligrams remained in the lens one hundred and nine days without causing symptoms of intolerance or pain. It produced merely a circumscribed opacity of the lens, and at the end of the period mentioned presented between the gaping lips of the capsular scar. Speaking of the general treatment of this class of injuries, the writer suggests that, when at the patient's first visit to the oculist the foreign body has remained for some days in the eye, has not caused suppuration, is of small dimensions, is well tolerated, is in a region where it may easily become encysted, and is not magnetic, an expectant course should be followed, although it may be decided to intervene at the first indication of intolerance.

General Treatment of Rheumatic and Syphilitic Iritis by Endovenous Injections of Cyanid of Mercury.

OLIVERES, Tortosa (*Archivos de Oftalmologia*, May, 1915). A dozen cases were submitted to this treatment, with highly satisfactory results. There was always immediate relief of pain, and the course of the disease was shortened. In every case the treatment with cyanid of mercury injections appeared much superior to that with salicylat. The one-fourth per cent solution in physiologic salt solution was used as being less hemolytic than the one-half and one per cent solutions, recommended by some writers for syphilis. From two to four cubic centimeters were injected every two days in one of the veins of the bend of the elbow.

A Case of Total Calcareous Degeneration of the Lens.

RIBAS VALERO AND MENACHO, A., Barcelona (*Archivos de Oftalmologia*, May, 1915). The patient was a youth of nineteen years. His right eye had been injured by a fall at the age of six years, and a year later it had been noticed that he did not see with this eye. The lens had become cataractous and was dislocated. Extraction of the lens was undertaken on account of inflammatory attacks with rise of tension. The extracted lens looked and felt like bone, and chemical analysis showed it to consist of calcium carbonat. A decalcified portion was found under the microscope to be an amorphous

mass without cellular structure. These tests were confirmed by the polarizing microscope, and the conclusion was that the cataract was not, properly speaking, osseous, but had undergone calcareous degeneration.

**Straight and Inclined Writing From the Point of View of
Infantile Hygiene.**

VERDERAU, L. (*Archivos de Oftalmologia*, May, 1915), argues that from the point of view of ocular hygiene, straight is preferable to inclined writing; that to avoid excessive efforts of accommodation and convergence the body must be kept straight; and that the formula "straight letter and straight body," put forward by Georges Sand, should be supplemented by the addition of "inclined paper," because for the correct position of the body in straight writing, inclined paper is preferable to paper placed straight before the body.

Entozoa Cysts in the Eye, in the Adnexa, and in the Orbit.

MENACHO, M. (*Archivos de Oftalmologia*, June, 1915). Three transparent cysts of the conjunctiva observed by the writer were regarded as parasitic on account of a marked independence in relation to the surrounding tissues, in spite of absence of confirmation by the microscope in two out of the three. Intraocular entozoa cysts are so rare that de Wecker only encountered two among one hundred thousand eye patients. Menacho saw one case of this character, a sub-retinal echinococcal cyst of the ciliary region. Entozoa cysts anterior to the crystalline lens are even less frequent. A colleague of Menacho's has under observation an entozoa cyst in the lens itself. Menacho describes from his own clientèle a case in which a small pear-shaped cyst, presumably of this same character, occupied the lower part of the anterior chamber. When the patient lay on his back and the head was inclined in various directions, the cyst was seen to travel to every part of the anterior chamber. Operation was refused. Menacho removed by operation the contents of a hydatid cyst which had existed in the orbit for at least twenty-one months without suppurating. A pressure neuritis had reduced the vision of this eye to 1/10, and there was pronounced exophthalmus. The walls of the cyst were very thick. The writer

insists on the importance of exploratory puncture in these cases, as furnishing information not otherwise obtainable as to the presence of a cyst and the nature of its contents.

Severe Infectious Ulcer of the Cornea.

LEOZ ORTIN, GALO (*Archivos de Oftalmologia*, June, 1915), does not regard as well founded the optimistic statements of a group of writers concerning the paramount efficacy of Roux's serum in hypopyon keratitis of endogenous or exogenous origin. In a few cases, not always, he has seen the pain diminish after the first injection of the serum; in eight cases an iritis yielded (but using atropin at the same time), and in as many others the general symptoms became less severe; but so slight, so fugacious were these improvements, that he always ended by treating the case along other lines. He regards serotherapy as having no advantages in these cases.

His treatment for severe corneal ulcer is to cleanse the eye with hot sterile water, instill a five-tenths per cent solution of atropin, and a few minutes later a two per cent solution of methylen blue. Even at the expense of rendering the cicatrix more indelible, he regards cauterization as necessary, and it should reach down to healthy tissue. Even better than ignicautery is chemical cauterization with sulphat or chlorid of zinc, iodin or carbolic acid, or preferably with a two per cent solution of nitrate of silver. In the late atonic stage scarlet red or picric acid has given better service than dionin. To paracentesis he usually objects (except as a last resort), because of the risk of carrying the infection within the eye, the hypopyon itself being ordinarily sterile. He prefers a hot vapor douche with one to two thousand solution of cyanid of mercury, employed night and morning, to the ordinary washing.

Twenty-eight Cases of Grave Toxic Lesions of the Uveal Tract and the Cranial Sensory Nerves Following the Therapeutic Use of Arsenobenzol.

ARGANARAZ, RAUL, Buenos Aires (*Archivos de Oftalmologia*, June, 1915). The twenty-eight cases are described individually, and the following conclusions are presented: (1) Postsalvarsan optic neuritis, whether it be of syphilitic origin or from arsenic poisoning, is aggravated by new injections

of arsenobenzol. (2) In patients attacked by optic neuritis, the therapeutic use of salvarsan is formally contraindicated. (3) Optic neuritis being of slow evolution, and without suggestive symptoms at the commencement, ophthalmoscopic examination of the fundus of the eye is called for before submitting the patient to salvarsan medication.

Curious Foreign Body of the Palpebral Conjunctiva.

PENICHET, J. M. (*Cronica Medico-Quirurgica de la Habana*, September, 1915). The patient felt as though a foreign body had entered his eye, but the disturbance had diminished by the time he reached the oculist first consulted, who found only a traumatic conjunctivitis of uncertain origin. The treatment lasted five weeks, at the end of which time the writer himself diagnosed a chronic conjunctivitis. At a second examination, however, the upper lid was turned more thoroughly than before, and at the deepest part of the cul-de-sac was seen a white point which was taken for a minute abscess. On incising it with a small bistoury, there appeared three-fourths of a grain of rice. The rest of the grain escaped unexpectedly three days later during an after-treatment.

A "naturalist friend" stated that the grain of rice had swollen, that its envelopes had begun to break, and that the rootlets were unfolding themselves within the grain.

ABSTRACTS FROM ITALIAN OPHTHALMIC LITERATURE.

BY

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NEW YORK.

The Relation of the Opsonic Index to the Aqueous Humor of the Diabetic.

CALDERARA (*La Clinica Oculistica*, January and February, 1915). The predisposition of diabetics to postoperative infections of the eye in preference to the other tissues of the body has occupied the attention of operators since the time when etiologic relationship was first established in diabetes between cataract, retinitis, iritis and affections of the optic nerve. Notwithstanding this knowledge, even today no operator is perfectly tranquil in operating, and never operates upon a diabetic, without applying the most rigid asepsis. It is well known that corneal wounds, suppurative keratitis, iritis, etc., in diabetics, runs a much severer course than in the sound and healthy. The author refers to the various reasons cited by others as to the cause of this diminished resistance, some advocating that glycose in the ocular liquids is the cause; others, toxic substances circulating in the blood; others, an alkaline reaction in the aqueous humor, etc. The author refers also to the large amount of experimental work done by the various observers to establish the cause of these well known facts, and finally takes up the consideration of his own work in three cases of bilateral diabetic cataract; the greater part of his observations, however, were made upon animals rendered diabetic by injection of fluorin, adrenalin, or by the removal of the pancreas. The technic followed was that described by Wright and zur Nedden. He set himself four problems to solve:

1. Whether the opsonic index of the second drawn aqueous humor in diabetics is equal or inferior to that in the sound.

2. What relationship exists between the opsonic index of the second aqueous humor in diabetes and that of the blood serum in the same patient.

3. Whether the diminution in glycosuria causes the opsonic index in the blood and aqueous humor to rise.

4. Whether in experimental infections of the cornea of animals rendered diabetic the passage of opsonins into the aqueous takes place to the same degree as in normal animals.

He then recites his experiments in man at great length, and draws the following conclusions from this particular series:

1. The first drawn aqueous humor of the sound or diabetic person does not show an opsonic power superior to that of a physiologic solution of sodium chlorid.

2. The second aqueous humor, drawn three hours after the refilling of the anterior chamber in the sound man, shows an opsonic power which is six to thirteen times greater than that of the first aqueous, and is the equal by about half of the opsonic power of the blood serum of the same individual; on the other hand, in diabetics the opsonic power of the second aqueous is only two or three times greater than that of the first, and is inferior by one-third to that of blood serum of the same patient.

3. The temporary disappearance of glycosuria after diet does not cause the opsonic index of the blood serum or that of the second aqueous to rise.

In the March and April number of the same journal, *La Clinica Oculistica*, the description of the experiments on animals by this author is continued, and the following conclusions are drawn:

1. In animals rendered diabetic by repeated injections of fluorin or adrenalin, likewise by complete extirpation of the pancreas, the alkalinity of the first and second aqueous remains, even when the urine gives an acid reaction.

2. In fluorin glycosuria the glucose does not disappear in the aqueous, while it does so in adrenalin and pancreatic diabetes where hyperglycemia is constant. In these cases the diminished reaction of glucose is always less marked in the newly formed aqueous, where it may be lacking entirely.

3. In experimental diabetes there is always a diminution of the opsonic power in the blood serum, and consequently in the second aqueous, during the first four hours after paracente-

sis; but while this fact is demonstrated early in adrenalin or pancreatic diabetes, and before the nutrition of the animal has been reduced, in fluorin glycosuria it is not observed until later, when the animal is profoundly depressed.

4. The opsonic power of the first aqueous of animals rendered diabetic does not differ as a matter of fact from that of the first aqueous of normal animals or from that of a physiologic salt solution.

5. In experimental diabetes, with diminished opsonic power of the serum and newly formed aqueous, subconjunctival injections of sodium chlorid (ten per cent), and corneal infections from the pyogenic microbes, always cause a slow and scanty passage of opsonins into the first aqueous as compared with that which is found in normal animals.

6. The diminution of the opsonic power of the aqueous in the cases cited is not dependent upon the abnormal amount of glucose in the aqueous, but rather upon the diminished opsonic power of the blood serum.

7. The greater gravity of corneal infections from pyogenic microbes in animals rendered diabetic is caused, above all things, by a scanty passage of opsonins into the lymphatic spaces of the cornea.

8. The alterations in the ciliary epithelium produced by injections of sodium chlorid into the anterior chamber, facilitate the passage into the aqueous of glucose and opsonins circulating in the blood.

9. The diminished opsonic power of the blood serum and aqueous in experimental diabetes can be raised by injections of vaccine after the manner of Wright.

Contribution to the Anatomy or Pathology of Socalled Aniridia.

CIRINCIONE, *SPECIALE (La Clinica Oculistica*, January and February, 1915). Clinically, aniridia has been known since 1820. The Englishman Morrison showed the first case of this condition at the Société du Cercle Medicaire de Paris. The diagnosis was doubted, and a commission was appointed to examine the case. It was that of a three-year-old child, sound in other respects, whose eyes showed large and bright pupils through which a red glow could be seen coming from the fundus. The vision was restricted to seeing large objects.

The commission decided that the diagnosis of aniridia made by Morrison was incorrect, and concluded it was a case of congenital mydriasis. Later observations, however, confirmed the opinion of Morrison, and many investigators have dedicated themselves to finding out the cause of this singular anomaly. Slowly the cases multiplied, but there were diverse opinions in regard to the embryologic and pathogenetic origin of the condition. Four hypotheses have been advanced, and they are the following:

1. The iris is normally developed before the process of absorption, which causes the disappearance of the pupillary membrane, is extended to the iris stroma.

2. The iris is arrested in development by reason of intra-ocular changes occurring in fetal life.

3. The iris cannot develop for a mechanical reason which is the contact of the crystalline lens with the posterior surface of the cornea, whereby it is made impossible for the uveal lamina to be thrust between the cornea and the lens.

4. The aniridia is the consequence of an arrested development in the retina.

The author cites a large number of cases observed by others, with the clinical and pathologic findings, analyzes their conclusions and cites his own experience, which consists in a study of two cases—one, true aniridia, and the other, incomplete aniridia.

The first was the case of a man of twenty-one years, the latter of a man of fifty-nine years. His description of his findings are painstaking, and to this contribution he has added colored drawings showing the histologic findings, which are admirable. He sets forth the following conclusions as showing the common characteristics of aniridia vera:

1. Rudimentary iris in the form of a triangle with a large base.

2. Crystalline lens diminished in size and opaque in that portion which corresponds to the posterior pole and in the center.

3. The ciliary body slightly developed with rudimentary ciliary processes.

4. The scarcity of retinal vessels and possibly hyaloid remnants in the vitreous.

5. In all these cases the epithelium of the ciliary body is

found normal; likewise the zonular fibers which proceed from it.

6. In none of these cases, not complicated by later changes, is any newly formed connective tissue found, nor cellular infiltration, nor atrophy which could possibly justify suspicion of the presence of inflammatory processes during fetal life.

This paper justifies us again in calling attention to the excellent pathologic experimental work done in the clinic of the University of Rome; the establishment of such an institution in this country would go far towards raising the standard of American ophthalmology along the line of experimental pathology.

ABSTRACTS FROM SCANDINAVIAN OPHTHALMIC LITERATURE.

BY

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Preequatorial Sclerectomy in Retinal Detachment.

SCHIÖTZ, INGOLF, Christiania (*Norsk Magazin for Laegevidenskaben*, April, 1915). Since 1911 every case of retinal detachment in Hjalfdan Schiötz's clinic has been treated by Holth's method of preequatorial sclerectomy. The present report covers the first nineteen of these cases and two of Hjalfdan Schiötz's private cases. After making a conjunctival flap outward and downward, a meridional cut is made in the sclera with a modified Graefe knife. As the choroid is approached, a suitable opening is cut in the sclera with Holth trephine scissors. Sometimes the choroid was intentionally cut, sometimes not, and sometimes the subretinal bleb opened itself spontaneously. Sometimes instead of trephine scissors a two and one-half millimeter Bowman's trephine was used. In no case was a postoperative reaction observed. Dressings or compressive bandages were never used, the eye being merely covered with an aluminum shield. A summary of each case is given. Five showed improvement, nine remained in the status quo ante, and six were worse, at the time of discharge from the hospital. At later examination three showed improvement, five maintained the status quo ante, and eleven were worse. The results under this treatment were not strikingly better than after other operations, but they were by no means worse; and as no better treatment is available, Hjalfdan Schiötz has continued to employ preequatorial sclerectomy, usually combined with the horizontal position, both before and after operation.

Spontaneous Cure and Value of Treatment of Retinal Detachment.

HOLTH, S. (*Norsk Magazin for Laegevidenskaben*, June, 1915), has not seen a single case of spontaneous cure of primary retinal detachment in the course of twenty-four years.

In the past two years he has told every patient with rents in a retinal detachment that he had never seen a single recovery in such cases. In Holth's opinion, if preequatorial sclerectomy is reserved for the detachments in which, after repeated painstaking ophthalmoscopy under atropin mydriasis, no rent can be discovered even at the utmost periphery of the fundus, more cures will be achieved by this method than with any other treatment which he knows. It may be argued that such cases offer a relatively good prognosis with nonoperative or other forms of operative treatment. But preequatorial sclerectomy has a great advantage as compared with most methods of treatment, in that when it does produce complete cure this is apt to come suddenly, which is of the greatest significance as regards the best possible reestablishment of the retinal function.

A Case of Choroidal Angioma.

HAGEN, SIGURD (*Norsk Magazin for Laegevidenskaben*, July, 1915). A seventeen-year-old patient who suffered with a congenital skin angioma which covered the greater part of the face, and extended on to the buccal mucosa and the conjunctiva, was stated to have been practically blind in the right eye since earliest infancy. The sight of the left eye had always been good until four months before the patient came to the hospital, but for this period the sight of this eye had also been affected, the disturbance of vision being accompanied by pains and by the appearance of colored halos around lights. Ophthalmoscopically there was found at the posterior pole of the right eye a tumor-like protrusion of glistening whitish green color, and the tension of the eye was somewhat raised. The left eye presented an advanced glaucoma simplex. Upon an attempt being made to perform a hypotensive operation on the right eye, an intraocular hemorrhage occurred, which made removal of the eye necessary fourteen days later. Microscopic examination showed the growth to be an angioma of the choroid. The patient did not come to the physician on account of the poor vision of the right eye, in which the tumor existed, but because of the rapidly advancing glaucoma in the previously healthy left eye. The tension was higher in the eye in which no tumor was found. It is suggested that the rise of tension in both eyes may have been due to anatomic anomalies of the vascular system.

SOCIETY PROCEEDINGS.

BY

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COLORADO OPHTHALMOLOGICAL CONGRESS.

HELD UNDER THE AUSPICES OF THE COLORADO OPHTHALMO-
LOGICAL SOCIETY, IN DENVER, COLORADO,
JULY 22 AND 23, 1915.

First Session, Morning of July 22, 1915. Dr. Edward Jackson, Denver, presiding.

Dr. E. R. Neepor of Colorado Springs, Colorado, read a paper entitled

Carcinoma, Apparently Primary, Arising from Ciliary Processes.*

DISCUSSION.

Dr. Edgar S. Thomson, New York, had never seen a case of primary carcinoma of the choroid. Diagnosis is most important in the early stages, and transillumination is by far the most satisfactory means of diagnosis of tumors of the ciliary region, since they show particularly well here, usually having a broad base. They may be confused with cysts of the iris, which, however, transilluminate very well. Increase of tension is apt to be a rather late symptom, later than in sarcoma of the choroid. In Dr. Thomson's cases there had usually been transient changes of tension as measured with the tonometer. As to whether this growth was primary, Collins' views as regards the ciliary glands have not been thoroughly accepted. The pars ciliaris has, however, all the characteristics of surface

*See page 611.

epithelium, and as such is much more liable to a primary growth than to a metastasis. In the histologic examination it is possible that we overlook some of these cases by not bleaching properly, and probably all such tumors should be bleached.

Dr. W. C. Finnoff, Denver, examined a number of eyes in the attempt to find the glands of Treacher Collins, but in none of the specimens did he find these structures, except possibly in one. He thought there was a possibility that these glands were easily mistaken because of the direction in which they were cut. The pigment epithelium is found dipping down into the substance of the ciliary body, and if the deep parts were cut transversely a semblance of a gland might be shown.

Dr. Francis Lane, Chicago, referred to a metastatic carcinoma of the choroid which he had studied and an account of which had been published. There was no pigmentation whatever. The growth resembled in form a flat sarcoma of the choroid. There was also glaucoma and pannus degenerativus. Metastasis occurred four years ago and the patient is still living.

Dr. E. R. Neeper, closing: The appearance of the growth itself, the retina being stretched over a firm object rather than falling in folds or loose, should call attention to the point that there is something hard behind it.

Dr. Francis Lane, Chicago, read a paper entitled

Peripheral Annular Infiltration of the Cornea Following a Scleral Perforation.*

DISCUSSION.

Dr. William C. Finnoff, Denver, called attention to the position of the wound, six millimeters behind the sclerocorneal junction. Of the cases reported by Fuchs, eight had wounds in the cornea and one in the sclera. The bacteria usually associated with ring abscess are the staphylococcus, the streptococcus, the pneumococcus and the bacillus of Hanke. These organisms are usually found in the anterior and posterior chambers and in the infiltrated portion of the cornea; in this way differing from serpentine ulcer. In differentiating ring ab-

*See page 619.

cess and serpentine ulcer, in the former the base of the wedge is away from the wound, and in the latter the base is toward the wound.

Dr. Harold Gifford, Omaha, was glad Dr. Lane had used the expression "peripheral infiltrate" instead of "ring abscess," as he considered the latter term, introduced by Fuchs, inaccurate. One of the most important things in diagnosis is to remember the fatal import which it conveys. Practically all the eyes which show this annular infiltrate are lost. Dr. Gifford had seen two cases. In the first, which had a central corneal wound and some pus in the anterior chamber, the eye went on to panophthalmitis in spite of his efforts. In the second case the patient remained under observation for only a day or so, and it seemed to be a chronic condition. The patient declined operation, and as he lived near by, although he was not heard from again, his eye probably got better. In this case the pneumococcus was apparently the cause of the disturbance, being present in large numbers in the secretion and in the scrapings from the original wound. The point at which the infiltrate develops is suggestive of the intense chemotaxis: the poisons, being present in enormous quantities around the periphery of the cornea, partake of the nature of the spaces of Fontana, and this probably explains the peculiar character of the annular infiltrate.

Dr. Francis Lane (closing) demonstrated the microscopic conditions present by means of the projectoscope.

Dr. William E. Gamble, Chicago, read a paper entitled
Albinism in Man and Animals, With Special Reference to the Eye.*

DISCUSSION.

Dr. G. F. Libby, Denver, could not see where smoked glass had any advantage over amber in reducing the photophobia. The amber tinted lenses cut out short wave light rays and admit those of longer length, that may assist in the development of pigment in the partially albinotic eye. The next albino Dr. Libby saw would be given noviol glass of the darker shade, which seemed to really eliminate the ultraviolet and infrared rays and gave about the same tint as the amber to

*See page 627.

objects looked at. Dr. Libby referred to a case of albinism previously reported by him (Transactions Ophthalmological Society, 1909). Each eye showed 4 D. of mixed astigmatism, axis 80 degrees — 170 degrees. Under full correction, ground in amber glass the shade of number 2 smoke, the vision was noticeably improved, the photophobia disappeared and the nystagmus and squint were lessened. Both Dr. Edward Jackson and he believed that there had been increase of pigment and stroma in the iris, and seemingly of pigment in the macular region and possibly in the choroid.

Dr. Park Lewis, Buffalo, had seen during the past year a family, four members of which were what would be called pure albinos. If an association were to formulate a series of questions directly bearing on the matter of heredity, as to the conditions which are found present, and other desirable matters, and such questions were sent broadcast to those who might see cases, many valuable data would be accumulated.

Dr. Linn Emerson, New York, being very fair himself, had suffered from a certain amount of photophobia, and after using light amber glasses for a while he found difficulty in doing without them. Lately he had been wearing the light Crookes shade, and after wearing them two and a half months he had been very comfortable, although the shade was scarcely noticeable.

Dr. E. L. Jones, Cumberland, Maryland, had had three children under observation, two of whom were twins, and only one of these twins was albinotic, while the other was normal.

Dr. H. S. Gradle, Chicago, referred to Elschnig's study of the albinotic eyes of a woman who died of tuberculosis. The retina, including the macula, was left in place. There was a little pigment in the anterior section of the uvea. In the posterior part the pigment cells were normal, except that they contained no pigment. There was no differentiation of the layers of the retina at the macular area. This probably explains the clinical symptoms of poor vision and nystagmus. The vision is no doubt reduced somewhat by the circles of diffusion, due to lack of pigment in the anterior uvea. He did not think the question of visual purple important in albinism, but that the lack of macular development was the important factor.

Dr. Harry S. Gradle, Chicago, read a paper on

The Blind Spot.*

DISCUSSION.

Dr. Frank R. Spencer, Boulder, Colorado, had been particularly impressed with the fact that Dr. Gradle had given a practical test for degeneration, functional disturbance, etc., of the peripheral fibers in the optic nerve. The thought had occurred to him that Dr. Gradle's test could be well applied to many other cases. For instance, mild types of orbital cellulitis, perineuritis of the optic nerve, serous meningitis, etc., might alter the function of the most peripheral fibers in the optic nerve and thereby produce a pathologic increase in the size of the blind spot. Increased intracranial pressure, in the very earliest stage, might produce enough pressure at the optic foramen to bring about a slight edema of the perioptic lymph channels, resulting in a pathologic increase in the size of the blind spot. Small, slowly growing brain tumors, small cerebral abscesses, serous meningitis, localized meningitis, extradural abscesses, small cerebral abscesses, etc., might all affect the optic foramen in an early stage. Tumors of the orbit, or even of the optic nerve itself, might in the early stages affect only the peripheral nerve fibers.

What experience, if any, had Dr. Gradle had with the perimeter in mapping out the blind spot?

Dr. E. S. Thomson, New York, asked what importance Dr. Gradle attached to changes in the size of the blind spot in sympathetic ophthalmia? Dr. Thomson did not understand how there could be enlargement of the blind spot in cases of iridocyclitis.

Dr. Harold Gifford, Omaha, said that if one got the idea that every time there was a change in the size of the blind spot we must correct any deformity found in the patient's nose, it was likely to lead to serious trouble. Two years ago he had a patient who complained of slight interference with the vision of his right eye. He found a very delicate change in the texture of the retina at the macula, a delicate fibrosis (concurrent in later by Dr. Weeks). He told the patient if anybody saw the nose they would operate upon it right away

*See page 637.

unless restrained by force. The patient went to New York and was recommended to have his sinuses opened at once, but did not, and his sight continued good.

Dr. Linn Emerson, New York, asked as to the relative value of the hand perimeter and the electric perimeter.

Dr. D. T. Vail, Cincinnati: On either side the optic foramen is surrounded pretty much by the sphenoid cavity. In cases of infection of the lining membrane of the nose it is easy to conceive how the lining membrane of the foramen partakes in the inflammatory process. If the sinus is blocked and abscess formation occurs, and the mucous membrane lining it is greatly swollen, the resulting swelling of the lining of the lumen of the nerve will press on the nerve. Why should this pressure produce a central scotoma when the papillomacular bundle lies central and therefore away from the direct application of pressure? It is because the fibers of this bundle are more delicate and more vulnerable.

Dr. H. S. Gradle (closing) stated that the perimeter, either of the hand or the electric type, had proven unsatisfactory in measuring the absolute size of the blind spot. First, the working distance is too short; second, the attention of the patient is detracted by surrounding objects and by the rod bearing the movable disc. It was to overcome these difficulties that he had prepared his tangent screen. He could not agree with Dr. Vail in the statement that the first symptom of optic nerve involvement from accessory sinus disease was a central scotoma. On the contrary, this appears only after enlargement of the blind spot. Again, the disease is more frequently bilateral than unilateral, although not necessarily at the same time.

Second Session, Afternoon of July 22d. Dr. Harold Gifford, Omaha, presiding.

Dr. F. E. Woodruff, St. Louis, read a paper entitled
Complete Left Lateral Hemianopsia With Glycosuria as a Result of Slight Trauma.*

DISCUSSION.

Dr. C. A. Ringle, Greeley, Colorado, had been profoundly impressed with the extreme sensitiveness of the nuclear cen-

*See page 662.

ters which might be affected as influencing the eye. It seemed desirable that ophthalmologists should insist upon more frequent examination of the eye in connection with various ocular affections.

Dr. Meyer Wiener, St. Louis, read a paper on the

Mydriatic Action of Dextrohyoscyamin.*

DISCUSSION.

Dr. H. S. Gradle, Chicago, corroborated Dr. Wiener's statements from his own experiments upon some of the drug which Dr. Wiener had supplied him with. He asked why, if we have a drug that is specific for the muscles of the iris, we should not also have a drug which is specific for the action of the ciliary body. Of course, with the cycloplegics in use we are not examining eyes which are under normal conditions, with the pupil mobile and capable of contraction. He was at present making some experiments with papaverin with this object in view.

Dr. Wiener (closing) stated that dextrohyoscyamin had been placed on the market by the Burroughs-Wellcome Company.

Dr. F. Park Lewis, Buffalo, read a paper on

Conscious Vision in Development of the Amblyopic Eye.†

DISCUSSION.

Dr. Linn Emerson, New York, suggested that Fuchs' textbook had done great harm to ophthalmology in stating that in cases of anisometropia with amblyopia only the better eye should be corrected and the other eye should be allowed to go. Dr. Emerson had seen a number of such cases in which accurate correction of both eyes had resulted in ability to use both eyes. He recalled one case of a lawyer who, after three months of considerable discomfort in the use of his glasses, became perfectly accustomed to the use of his two eyes. In another case, following injury in the other eye, the vision of the previously amblyopic eye which had been 20/70 rose to normal.

Dr. E. L. Jones, Cumberland, had stated before that no mat-

*See page 672. †See page 675.

ter how amblyopic an eye was, if the other eye were lost the amblyopic eye would become capable of accurate vision. The same was true as regards covering the good eye, if this was kept up for a long time; or by keeping the good eye under atropin, provided that this eye were worse under atropin than the amblyopic eye. In covering the good eye it must be so covered that the child could not even peep. He commonly used adhesive plaster for this purpose. In older people the vision of the second eye, after injury of the first, would come up very slowly, but still it would steadily improve. The key of the whole matter was to keep the good eye "behind" the other and to give the mind of the patient the consciousness of depending upon the eye which was amblyopic.

Dr. H. M. Thompson, Pueblo, mentioned the case of a man who had had vision of 20/200 in one eye, and who lost the other eye by an injury. With correction, in the course of six months the vision of the remaining eye had become quite as good as the vision of the other eye had previously been. In another case, of an highly hyperopic and astigmatic eye with vision of fingers at several feet, by cooperation of the mother and by excluding the good eye with atropin and shades, the vision of the bad eye had come up to 20/40 or 20/30.

Dr. E. S. Thomson, New York, invariably, or almost invariably, corrects the amblyopic eye, and under ten or twelve years the patient usually improves rapidly. Ordinarily with children he uses exercises along Worth's lines, getting the image with the amblyopic eye and then opening the other eye and gradually developing the ability to see with both eyes together.

Dr. Melville Black, Denver, fully concurred with the previous speakers that every effort should be made to restore the vision in amblyopic eyes and to make them work with their fellow eyes. He would sound a warning, however, that not all such patients should be assured that such a happy result will always follow. As an illustration he reported the case of a boy of seventeen years who lost one eye by an accident. His fellow eye had always been highly amblyopic, with eccentric fixation. Dr. Black worked for months with the high frequency current without result, and now, after the lapse of

four years, the vision has not improved and the fixation is still eccentric.

Dr. H. S. Gradle, Chicago, said that although not directly pertinent to the paper, he would like to suggest that the terms "stereoscopic vision" and "binocular vision" were used too interchangeably. If, as Dr. Lewis suggested, the lack of binocular vision is accompanied by a slight retardation of cerebral development, should we not assure ourselves, before discharging the patient, that true binocular vision exists? This can best be done by use of the Czermak single filament lamp and testing for areas of retinal correspondence.

Dr. R. S. Lamb, Washington, advocated operating on the squinting eye, covering that eye that night, then next morning covering the other eye and leaving the operated eye open with the correcting lens over it.

Dr. E. T. Boyd, Denver, thought the term "binocular single vision" should often be used where the term binocular vision was commonly employed.

Dr. F. Park Lewis (closing) remarked that it was a very general opinion of writers that amblyopic eyes did not attain full function after the age of six or seven years. He did not intend to suggest that in all cases the amblyopic eye could obtain normal vision. It was his desire to emphasize the point that conscious effort could be and should be used. The mechanical use of the second eye was not so valuable as the conscious use of the eye.

Dr. R. S. Lamb, Washington, read a paper entitled

Is Migraine a Forerunner of Glaucoma?*

DISCUSSION.

Dr. H. M. Thompson, Pueblo, had in mind the possibility of variations in tension which might give the patient trouble without representing a true glaucoma. Genuine migraine is often periodic and combined with other disturbances such as nausea or vomiting. He was not prepared to say that glaucomatous states were not preceded by migrainous attacks. In two recent cases of glaucoma he went closely into the past history. Both gave a history of migrainous attacks

*See page 683.

preceding the glaucoma. In one the migrainous attacks extended over years before the glaucoma; coming on every few weeks and extending over two or three days. The other patient was a woman of sixty-six years who had migraine for six years before developing glaucomatous symptoms.

Dr. Melville Black, Denver, did not think that the author had proven that migraine was a forerunner of glaucoma. Dr. Lamb was apparently treating his cases of migraine as though they were cases of glaucoma. Dr. Black had never seen a migraine subject develop a condition which could be diagnosticated as glaucoma.

Dr. Linn Emerson, New York, had observed that glaucomatous patients gave a history of migraine. He was surprised that Dr. Lamb had not laid more stress on the underlying causes of migraine and glaucoma, which, in his opinion, were uncorrected hyperopia and astigmatism. Practically all of the cases with migraine have astigmatism, and a large proportion of them have hyperopic astigmatism. In a large proportion of these cases the migraine disappears with the oncoming of presbyopia.

Dr. H. S. Gradle, Chicago, could not agree with Dr. Emerson that the cause of glaucoma lay in the error of refraction. How about hyperopia due to diabetes, where we never see development of glaucoma? Ever since the publication of the absolute lack of tonicity of the eye in diabetic coma, he had treated cases of glaucoma with a large consumption of sugar. He thought that the attempt to produce artificial glycosuria would aid in the treatment of glaucoma.

Dr. A. E. Prince, Springfield, asked whether anybody present had ever seen a case of definite typical migraine result in glaucoma.

Dr. R. S. Lamb, Washington, replied that he had distinctly said that some of his cases of glaucoma had given a history of migraine for years without any notice having been taken of it.

(To be concluded in the January number.)

CHICAGO OPHTHALMOLOGICAL SOCIETY.

Regular meeting, held May 17, 1915. Dr. Richard J. Tivnen, the president, in the chair.

Seton Operation for Glaucoma.

Dr. Frank Brawley presented two clinical cases. The first, a seton operation for glaucoma, was operated on May 4, the tension now being slightly raised, by tonometer fifty-nine millimeters. There has been no pain since the operation, and the eye is practically quiet. The treatment consisted of atropin and salicylates, her own physician taking care of the diet and hygiene.

Proptosis of the Globe Downward and Upward.

The second case was one of proptosis of the globe downward and upward, with a floating swelling over the forehead caused by hypoplastic ethmoiditis, without pus, and diagnosed mucocele. When the sinus was opened no connection with the nose was found. Where the nasal duct should have been, there was about two centimeters of cancellous bone, the floor of the frontal sinus being necrotic. The necrotic bone was removed and the sinus thoroughly curetted and drained. The operation was performed on the 16th of April, practically a month ago. The interesting feature of the case was the fact that the patient was not conscious of any double vision up to the time of the operation, but the rapid restoration of the eye produced a diplopia. At the present time the muscle balance is normal.

Discussion.—Dr. Good inquired if there was a large cavity when the mucocele was removed.

Dr. Brawley stated that the large cavity in the floor of the frontal sinus was entirely removed. On examining the ethmoid region, no break was found through it.

Symblepharon.

Dr. Clark Hawley presented the case of a young man who was making experiments in a test tube. There was an explosion, and a large mass of material in the tube was thrown into

the lower sulcus of the eye, producing a severe burn. This material had to be scraped away. Healing left a symblepharon which extended up to the extent of the burn on the cornea. When the patient looked up, the lower lid was carried up with the cornea. The symblepharon was removed three weeks ago in the hospital. It was very much like a pterygium, extending over quite a large portion of the lower lid and a portion of the cornea. After dissecting the pterygium from the cornea an incision was begun at the lower border, extending upward and over the center of the eyeball, well up on top of the eyeball. Two stitches were placed in the conjunctiva before cutting it off. The part dissected was about three millimeters wide, and the dissection carried to the nasal side of the eyeball. Two or three stitches were then put in the lower portion of the flap, as it was necessary to fasten it somewhere. That allowed a stretching of the conjunctival flap, and the lower lid is now entirely free from the cornea, with no symblepharon. Dr. Hawley stated that the next operation would probably be to try to restore the sulcus for the lower lid. At the present time the condition is very much improved, and will be shown later in the second stage.

Evolution of Ophthalmic Lenses.

Mr. Max Poser, Rochester, New York, spoke on the evolution of ophthalmic lenses, describing a new system of designating their powers. His remarks were illustrated by numerous stereopticon slides.

A vote of thanks was extended to Mr. Poser for his instructive lecture.

PAUL, GUILFORD,
Secretary.

COLORADO OPHTHALMOLOGICAL SOCIETY.

Special meeting, Pueblo, Colorado, May 22, 1915. Dr. J. J. Pattee, presiding.

Dr. F. T. Wallace, Pueblo, presented six patients, as follows:

Perimacular Spots.

Miss G. T., aged twenty-three years. About June 25, 1914, noticed vision of right eye was impaired, being 20/200. Central scotoma for form and color. Around macula can be seen a few small, faint, dark, granular spots. Complains of eye aching after close work, and has been subject to severe headaches for the past four years. Neurotic temperament. Examination two years ago revealed tubercular process in right lung; von Pirquet and Moro tests positive. Recent tuberculin test negative. Wassermann seven months ago positive—probably inherited lues. Some improvement in vision. He regarded the macular changes as tubercular rather than specific.

Discussion.—Dr. Edward Jackson, Denver, thought the process tubercular.

Dr. D. H. Coover, Denver, has a similar case in a girl of twenty-two years, whose vision was 5/60. There is a distinct exudate in the macula with pigmented ring. Physical examination negative. No improvement under tonic treatment, but it was marked under tuberculin, with which she has been treated six months, and the vision is now 5/15. Dr. Coover believed the case shown by Dr. Wallace to be tubercular.

Retinal and Choroidal Changes.

Mr. C. T. two years ago first noticed impaired vision of the left eye and diplopia. At the time of examination, November 14, 1914, vision in right eye was 20/20. Left eye vision, direct, discerns hand movements, while from the side fingers can be counted at two feet. Divergent squint. Media hazy. Peripheral vessels indistinct, some being obliterated. Black spots and whitish areas can be seen. Proliferation of the vessels throughout the fundus and running from above downward, a broad, crooked, ragged edged, whitish scar.

Discussion.—Dr. E. R. Neeper, Colorado Springs, thought that it might possibly be due to some obstructive lesion in the nose, or perhaps the result of trauma.

Dr. Edward Jackson thought it not unlikely that it was congenital, as there was the appearance of what might be termed a connective tissue mass.

Dr. D. H. Coover said that it might have occurred from hemorrhage the result of a blow.

Dr. J. A. Patterson, Colorado Springs, said that it had occurred to him that the condition could be the result of hemorrhage.

Dr. Wallace stated that there was no history of injury.

Simple Glaucoma.

Mr. F. P., aged fifty-two years. Right eye vision, 20/20. Vision of left eye began to deteriorate two years ago; no pain, soreness or headache. Can now see movements of hand. Slightly increased tension with shallow anterior chamber. Pupil does not react to light, but does consensually. Disc white, cupped, ring of pallor around it. Pulsating arteries with silver wire effect. Choroidal vessels can be seen.

The doctor wished to know what was best to do in the case.

Discussion.—Dr. A. C. H. Friedman, Colorado Springs, thought it a case for operation.

Dr. Edward Jackson believed that a trephining might possibly prove of benefit.

Dr. D. H. Coover concurred with the former speakers, and incidentally remarked that Knapp did not trephine inflammatory cases.

Plastic Uveitis.

Miss L. P., aged twelve years. "Sore eyes" since babyhood, with redness, lacrimation and occasionally pus. On December 1, 1914, left eye was quiet, with normal tension. Right eye, tension plus three. Sclera purplish and thinned out above. Anterior chamber obliterated except in center. Seclusion of the pupil. No tenderness on pressure. Enucleation advised but refused.

Discussion.—Dr. Edward Jackson observed that unless the eye became quiet, enucleation would be proper.

Diabetes—Cataract—Corneal Infiltration.

Mrs. McC., aged sixty-one years. Asthma for fifty-nine years, diabetes mellitus for seven years, and frequent attacks of neuritis of right side for past two years. Four years ago vision of right eye began to fail, blindness ensuing in two years. In April the eye got red, but there was no pain, tenderness or swelling.

She consulted him May 3rd of this year, at which time he found sclera congested and cornea so steamy that it was difficult to make out the markings of the iris. Pupils symmetrical and reactions normal. Tension, anterior chamber and iris, normal; likewise corneal sensibility. Found corneal infiltration and mature cataract. Perception and projection of light good. Large amount of sugar found in the urine with specific gravity of 1030. No glaucoma, but first appearance suggested it.

Specific Keratitis and Cleft Palate.

T. S., boy, aged four years. One of seven pregnancies. First and third aborted about the seventh month. Second child died at three months. Fourth child is seven years old and healthy. Fifth is T. S., the patient. Sixth and seventh are living and healthy.

August 1, 1914, was consulted. Child had had sore eye for one week. Muddy iris, contracted pupil, and interstitial keratitis involving lower part of cornea. This seemed to have cleared up by December 1st.

On April 12, 1915, he again saw the patient, at which time the upper portion of the cornea was involved. This partially cleared up, but other portions of the cornea became affected. There is cleft palate and bad teeth, which he attributes to the specific process.

Dr. H. M. Thompson of Pueblo, presented five patients showing the following conditions:

Right Eye, Progressive Cataract. Left Eye, Total Cataract.

Mr. F. H., aged twenty years. Left eye began to fail one year ago. Right eye vision, on March 8, 1915, was 20/30 w. plus 2 sph. combined w. plus 1.50 cyl., ax. 15°, at which time there was opacity of the lens at upper and nasal side. On May

20, 1915, the vision had improved to 20/20 with correction. Dr. Thompson believed opacity of lens in this case to have been due to eye strain, and Dr. Patterson agreed with him.

Chorioretinitis.

Mr. J. V., aged twenty-eight years. Austrian, miner. Two brothers living and well. Four brothers and one sister died in infancy. Father and mother living and well, ages sixty-five and fifty-three years, respectively. Patient is moderate user of alcohol and tobacco. Wassermann and urine negative. In 1914 had gonorrhea. Knee jerks sluggish. Complains of impaired memory. Four months ago vision failed suddenly. Right fundus shows less chronic change than left, especially in the region of the macula. Lesions in the left eye probably due to old process.

May 14, 1915, right eye vision, fingers at four feet; left eye vision, 20/200.

May 22, 1915, right eye vision, 20/100; left eye vision, 20/200.

Discussion.—Dr. Nepper thought the lesions of specific nature.

Dr. Jackson did not believe that the vision could be improved.

Posterior Polar Cataract in Right Eye. Subluxation of Traumatic Cataract in Left Eye.

Mr. T. H., aged fifty-three years, blacksmith. Vision of right eye began to fail one year ago, and is now 20/50. There is posterior polar cataract, with opacity extending from posterior central capsular region.

In 1905 the left eye was forcibly struck by a piece of hot iron, following which the vision gradually grew worse. There is an opaque lens dislocated downwards. Iris tremulous. Pupil reacts normally. Up to two years ago had had recurring attacks of inflammation, but since that time vision has apparently improved. No fundus change.

Discussion.—Dr. Jackson thought it best to extract the left lens.

Dr. Friedman believed that as there is a cataractous process in the right eye, the left lens should be extracted.

Parenchymatous Keratitis.

N. J., aged fourteen years. Father apparently healthy, but is subject to rheumatism. Denies specific history. Mother, forty-nine years old, has had epileptiform convulsions for fifteen years. Six living children. Seven stillborn babies before this patient.

Patient was injured over left eye, and to this has been ascribed his present eye trouble. For some months has had so-called growing pains.

April 20, 1914, right eye vision, 20/15; left eye, marked interstitial keratitis, iridocyclitis with bulging cornea.

Wassermann on patient + + + and + on father. Mother placed on specific treatment and recovered.

Retinal Detachment.

Mr. N. C., aged twenty-seven years, steel worker. Sixteen months ago noticed that the vision of left eye was greatly reduced and that objects appeared dark; of late, objects seem white. Sees objects best to his left: poorly in front and to the right. Pupillary reactions, anterior chamber and tension, normal. Right eye vision, 20/20; left eye vision, counts fingers at four to six feet. Urine normal. Wassermann negative. Color of retina in upper and outer quadrant has varied from whitish and a pale pink to a dark red, from time to time. Folds are moderate. Disc and about three-fifths of the fundus are not involved.

Discussion.—Dr. Neepor agrees with Dr. Pattee, that it is a case of detached retina and not a tumor.

Luetic Degeneration of the Right Eye.

Mr. E. R. H., aged forty years, American, laborer. Father died at eighty-six years of age. Mother insane for sixteen years, and died at the age of sixty-seven years. Patient married when twenty-nine years old, and has four children. The two older children have nystagmus and deficient vision, while the two younger are well and without defect. Wife's first pregnancy miscarried at fourth month; the two following pregnancies went to term, then a miscarriage at three months, again followed by two deliveries at term.

At the age of eighteen years, the patient had nephritis. In

1901 had chancre, which was untreated. Wassermann not made.

Vision of right eye began to decrease in 1898 (before appearance of sore on penis), and is at present absolutely blind. Pupil reacts consensually but not to direct stimulus. There is an opaque, luxated lens. Iris tremulous and of lighter color than that of fellow eye. The lens can be dislocated into the anterior or vitreous chambers. Marked exotropia since dislocation of lens took place, two years ago. Fundus shows choroidoretinitis.

Dr. J. J. Pattee of Pueblo presented three patients, showing the following conditions:

Old Choroiditis.

Mrs. S., aged forty-three years. Has three children, ages nine, thirteen and twenty years. In 1908 had an attack of iridocyclitis of three months' duration. She complained of great debility. Right pupil dilated, punctate deposits of infiltration all over the cornea, with a dense central deposit of same. Much pain, photophobia and redness of bulbar conjunctiva. Iris figure lost. Right eye vision, counts fingers at ten feet. Was given potassium iodid, mercury and iron. In three months vision cleared and was 20/30; cornea clear and iris normal.

August, 1911, had recurrence, but of milder degree, lasting two months. Vision reduced to counting fingers at fifteen feet.

There are some vitreous opacities. A large white area above disc. Dark pigment areas are numerous above white patch. Vision is 20/20 — 4. Urine normal.

Optic Atrophy in Right, Old Injury in Left Eye.

Mr. H. M., aged sixty-nine years. Steel worker. Left eye injured sixteen years ago by rebound of limb of tree. The eye was very much swollen, reddened and vision reduced. The vision improved for three months, after which there was no change, so far as he could tell. There is a scar below the left eye, but no evidence of penetrating injury of the globe. The left pupil is dilated, the fundus and disc normal. Left eye vision, 16/32.

About three months ago he discovered that the vision of the right eye had so failed that it was lower than that of the left, whereas formerly the reverse was true. The right pupil is normal in size and action. Tension and anterior chamber normal. The retinal vessels present evidence of arterial sclerosis and the disc is very pale. Right eye vision, 16/100. Admits gonorrhea, but denies syphilis. Blood pressure 160 mm. Hg. Urine normal.

Discussion.—Dr. Jackson believes that the retina of the right eye is somewhat swollen.

Dr. Neeper thought that there was a blocking of the retinal vessels due to embolus.

E. T. BOYD,
Secretary.

PHILADELPHIA POLYCLINIC OPHTHALMIC SOCIETY.

Meeting held March 11, 1915.

SYMPOSIUM ON GLAUCOMA.

The Pathogenesis and Etiology of Glaucoma.

Dr. Samuel D. Risley (by invitation) said that he knew of no chapter in ophthalmology which had a wider literature than this, and in which so little general advance had been made until within a few years, and so far, he believed, much of the delay in a definite judgment and opinion with reference to this disease was due to the name—that is to say, the term “glaucoma.” It should be studied from the standpoint of the symptom complex and what it stands for, increased tension of the eyeball. For a number of years he has been very much interested in the study of the uveal tract of the eye, and as long ago as the time of the late Dr. Shakespeare, when the talks they had on the subject of the investigations to be made along the lines of the choroidal tract led to the latter inventing the microscope.

Dr. Risley said that to him increased tension of the eyeball still constituted one of the most perplexing and discouraging chapters on ophthalmology. He said that he would like to dismiss the term glaucoma and study the significance of increased tension of the eyeball. After quoting from his article, “An Inquiry Regarding Increased Tension of the Eyeball,” which he read before the American Academy of Ophthalmology and Oto-Laryngology in 1913, Dr. Risley said that the great question was the etiologic factor.

If we pass rapidly before our minds the considerable group of ocular conditions which either culminate in increased tension or threaten to do so, we will be impressed by certain significant facts. For example, if we consider the atypical forms of glaucoma—(a) The buphthalmic eye of infancy and young childhood; (b) the cases of serous iritis; (c) chronic recurrent iritis of the plastic type—in each we find increased tension, seriously impaired acuity of vision, and when possible

to determine it, a contracted field; and in the laboratory, cupped optic nerve, frequently the signs of an optic neuritis, choriocyclitis, iritis, atrophied ciliary muscle, dilated ciliary vessels, a degenerated vitreous body and an opaque lens.

Another atypical group is constituted by (a) perforated cornea from corneal ulcer, or by perforating and infected wounds, leading to a partial corneal staphyloma, empty anterior chamber, iridocyclitis, increased tension and loss of vision. In the laboratory, cupped optic nerve, inflamed and swollen, turgid or atrophic ciliary muscle, dilated ciliary vessels, degenerated vitreous and opalescent or opaque lens.

Approaching the usually regarded typical forms, that is to say, the so-called primary glaucoma, our minds at once revert to their usual grouping: (a) Glaucoma simplex, or the so-called noninflammatory type, regarding the nature of which there has been so much discussion. (b) The subacute inflammatory type, beginning with transient impairment of vision, recurring attacks, increasing in severity and with briefer intervals between the exacerbations, the inflammatory features and pain meanwhile growing more pronounced, the anterior chamber shallow, the cornea steamy, the iris atrophic; the impairment of vision, the contraction of the field and increased tension, at first transient but becoming permanent. The anterior perforating vessels (long anterior ciliary) becomes permanently engorged; and from the first the transient attacks are associated with impaired range of accommodation. If neglected, total blindness ensues, and the disease passes into a stage of absolute glaucoma. In the laboratory is found a deeply cupped disc, atrophic optic nerve, atrophic ciliary muscle with evidence of preceding inflammation, dilated ciliary vessels, degenerated vitreous body, opaque lens; invariably both eyes in near sequence are involved. (c) The acute inflammatory type, more violent from the onset, the final result, as set forth in the former group, rapidly consummated, and the same laboratory findings in more exaggerated form. (d) The so-called hemorrhagic glaucoma, constituting one of the most striking and hopeless forms of the disease with which the ophthalmic surgeon meets.

He has in this summary eight well defined groups characterized by increased tension of the eyeball and its disastrous sequelæ, and by certain pathologic findings in the laboratory,

more or less common to them all. What relation, if any, do they sustain to each other? Is there some etiologic factor, more or less common to them all, to which the increased tension is secondary?

In discussing these inquiries there are certain general considerations that cannot be evaded. If we take, for example, the buphthalmic child with its destructive uveal disease, beginning before birth or during infancy or early childhood, we find it is obviously dependent on or constitutes a part of some general, usually hereditary disease. He has published a striking example of the latter, under the caption of "Prenatal Iritis in a Syphilitic Child," in which the buphthalmos occurred and the child passed into imbecility, the victim of syphilitic endarteritis.

In conclusion, Dr. Risley said that treatment of glaucoma or increased tension of the eyeball must be addressed to the etiologic factor, which, if done early, holds out hopes of recovery.

Use of Myotics in Chronic Glaucoma.

Dr. Posey spoke on the use of myotics in the treatment of chronic glaucoma. He cautioned, however, that this form of treatment was applicable only to cases in which there were no inflammatory symptoms, as the presence of these latter demand some form of immediate operation. Myotics to be effective must be employed persistently and continuously four times a day. Their effects pass off at the end of three hours, and if the maximum amount of contraction of the pupil is to be maintained, the reinstallation must be faithfully carried out. In beginning cases the dose of the myotic should be weak, to avoid creating spasm of the iris or ciliary muscle, the strength being increased from time to time, as the drug loses its effect upon the pupil. Dr. Posey said he employed the nitrate of pilocarpin at eight o'clock in the forenoon, and one and six o'clock in the afternoon, but ordered the salicylate of eserin for the last instillation at night, on account of the more lasting effect of the latter drug. To obviate the irritation set up sometimes by the myotics, he spoke of the necessity of flushing out the conjunctival cul-de-sac some ten or fifteen minutes before the myotics were employed, with boracic acid solution. All myotic solutions should be compiled fresh once a month,

and should be perfectly sterile. Care should be taken to keep the dropper sterile. Attention should be given to the general health, tobacco prohibited, and strychnin and alteratives prescribed for their effect on the optic nerve. He quoted figures deduced by him which showed far greater success from the treatment of myotics than from operation. He thought the treatment applicable to all stages of chronic glaucoma. He advised operation, however, on all hospital cases, on account of the difficulty of keeping this class of cases under continuous observation.

Discussion.—In closing, Dr. Posey said that while the persistent, continuous use of myotics is a nuisance, nevertheless, they never did any harm; whereas, even the most skillfully performed iridectomies frequently interfered with vision by the creation of opacities in the lenses in consequence of hemorrhage from the iris at the time of the iridectomy.

Meeting of April 8, 1915.

SYMPOSIUM ON THE NEUROOCULAR SYMPTOMS OF TABES.

Ocular Palsies in Tabes.

Dr. Posey spoke of the transient tendencies of these palsies, stating that it is an almost constant experience that the palsies that appear in the early stages of the disease vanish after periods of persistency ranging from but a few hours to two or three weeks; and, moreover, while it is true that the palsies that occur in the later stages are as a rule permanent, even these may be transient and may totally disappear, usually after a longer period, however, than when they are observed at the commencement of the disease. Thomas, who analyzed one hundred and eleven cases of tabes from the Hopkins clinics in 1899, found the initial symptoms to consist of diplopia in six instances, and of other symptoms in fourteen instances. Diminution of vision was the initial symptom in four cases. Double vision and dimness of vision were associated once, and double vision with other symptoms seven times. Ptosis was the first symptom, associated with pain twice.

Dr. Posey found that the palsies vanished, for a time at least, in perhaps ninety per cent of the cases which he had under observation. This percentage was based on an analysis

of the history of sixty cases taken from his own records, and from the study of twenty-eight cases of advanced tabes which he had at one time made in the wards of the Philadelphia General Hospital.

The tendency of the palsies to recur was also dwelt upon, either the same muscles being repeatedly palsied or the paralysis appearing in another muscle or muscles shortly after it had disappeared in one governed by the same nerve. In some cases the palsy may pass away in a few hours; in others it may persist for years. This return of the muscle to its normal after even years of paralysis should be recognized by ophthalmic surgeons, and should tend to discontinue operations on the eye muscles of tabetics. Tabetic palsies are usually dissociated. This is essentially true when the palsy appears as an initial symptom.

Of a large number of cases studied by Uthoff, it was found that the oculomotor was involved in fifty-four per cent, the abducens in thirty-three per cent, and the trochlearis in eight per cent of the cases. From an analysis of sixty cases Dr. Posey observed, he found that the oculomotor was at fault in thirty of the cases, the abducens in six and the trochlearis in two. Paralysis of the eye muscles occurs in about twenty per cent of all cases of tabes.

Dr. Posey stated that it has been his experience that inequalities in the size of the pupil and disturbances in its reaction are found in the early stages of cerebral syphilis, often associated with optic neuritis, while palsies of the extraocular muscles, as a rule, belong to the later stages. When syphilitic palsies do occur in the early stages, they develop more gradually and persist longer, tabetic palsies, as has been said, manifesting a tendency toward speedy disappearance and frequent recurrence. Conjugate deviations and ophthalmoplegia externa are caused almost exclusively by syphilis.

According to Gowers, the initial symptom of tabes rarely appears within the first three years after the chancre; indeed, in one of his cases it was not noticed until forty years afterward. Spiller thinks that usually about nine years elapse after the initial lesion before syphilitic palsies of the eye muscles appear. From a pathologic study of eleven cases diagnosed clinically as tabes, Spiller found considerable lymphocytic infiltration of the pia, with thickening of the pial vessels.

Nervous Symptoms.

Dr. John H. W. Rhein (by invitation) called attention to the fact that the early syphilitic manifestations, especially the skin lesions, in cases in which tabes developed later, were never very pronounced, and in some of the cases there was no history of syphilis obtainable whatever. The recent studies of the Wassermann test make it probable that all cases of tabes dorsalis are luetic.

Noguchi found the spirochete pallida in one of twelve cases of tabes studied. His findings have given rise to the belief that tabes and paresis are actually syphilitic manifestations rather than parasyphilitic. Dr. Rhein was not inclined to accept this view, as the response to treatment and the absence of characteristic pathologic findings of syphilis in cases of tabes is against this.

Dr. Rhein referred to his pathologic study of sixteen cases of tabes in which he found round cell infiltration of the meninges in all cases, but which was not typical of syphilis except in five cases. He was inclined to the view that there was in all cases of tabes, however, besides the parasyphilitic lesion, more or less a syphilitic process. Therefore, in these cases an antisiphilitic treatment is indicated. He called attention to the fact that there was a lymphocytosis in the cerebrospinal fluid: ten to twenty cells in the cubic millimeter, indicating weakly positive reaction; twenty to sixty cells in the cubic millimeter, a positive reaction, and over sixty cells in the cubic millimeter, strongly positive. Globulin is increased and the colloidal test of Lange is positive in eighty to ninety per cent of the cases.

The symptoms of tabes are sensory and trophic mainly, motor disturbances being late except in the case of the ocular nerve, when they may be among the first symptoms. A possibility of a round cell infiltration as a cause of ocular symptoms was mentioned.

The intraspinal injection of salvarsanized serum was recommended in cases of tabes, even when there is optic atrophy. For the crises, section of the posterior roots from the seventh to the tenth dorsal nerves has been recommended. Also a tearing out of the fifth, sixth, seventh, eighth and ninth intercostal nerves, a procedure recommended by Franke.

The importance of rest, electricity, hydrotherapeutics and Frankel's exercises was emphasized.

The Optic Nerve in Tabes.

Dr. William Zentmayer: The only pathologic condition of the optic nerve occurring as an integral part of the tabetic process is atrophy. Optic neuritis and diseases of the chiasm manifesting itself as a hemianopsia may be associated conditions, but occur as the result of a common etiologic factor, namely, syphilis.

The type of the atrophy is primary, but, according to Fuchs, the nerve head often looks as though the atrophy was a secondary one.

The frequency with which optic atrophy occurs in tabes is about ten per cent. As Dr. Rhein has pointed out, it may occur in the preataxic stage or later after the case is well advanced.

The subjective symptoms are a failure of central vision and color perception. When this is determined objectively, it is seen that fields of vision for red and green are very much contracted and that this is soon followed by a similar contraction for yellow and blue. Long after color perception has failed, the limits of the field for form may yet be of fair size. Later, however, this also contracts and total blindness ensues. The occurrence of a central scotoma is said by Uhthoff to occur in about two per cent of the cases, but Fuchs' experience has led him to believe that it is of greater frequency. According to Fuchs, the scotoma begins as a perfectly central one for color. Later there is extension toward the temporal region, and finally the scotoma merges with the blind spot, which itself has increased in dimensions. Careful search after the technic of Bjerrum will disclose small absolute areas within the relative area and also a zone of absolute scotoma about the central one. Indentation of the peripheral form field occurs, and this increases until it meets the central blind area.

The course of optic atrophy is two to four years. A question that has been much discussed is as to the effect of the atrophy on the prognosis of the spinal cord trouble. It is believed that when the atrophy is an early symptom the prognosis of the tabes is better; at any rate, that the ataxia is delayed.

There is a difference of opinion as to the tissues first involved in the visual tract. Some consider that the degeneration begins in the ganglion cells of the retina, while others

consider that the papulomacular bundle is first involved. The changes found in the optic nerve are degeneration of the medullary sheath, breaking down of the axis cylinder. The fibers become varicosed and show droplets of myelin and fat. Interstitial changes are noted, but are considered to be secondary.

Dr. Zentmayer said that on what he supposed to be empiric grounds alone, it has been considered somewhat hazardous to use mercury in this form of optic nerve degeneration. It is important to remember Uhthoff's dictum, that without syphilis there can be no progressive optic nerve atrophy.

Intraocular Muscles in Tabes Dorsalis.

Dr. Luther C. Peter: Early evidences of intraocular involvement are: First, irregularity in the pupillary outline; and second, inequality of the pupils or anisocoria. Both of these phenomena may mark the beginning of the Argyll-Robertson pupil. Posterior synechia should be carefully excluded. Inequality of the pupil is present in a large number of cases, but the difference between the pupils is slight. The unequal pupil may be dilated or contracted; dilated in diseases of the cilio-spinal centers and sympathetic, in paresis of the sphincter of the iris, and in a break in the centripetal reflex path. Accidental mydriasis, ruptured sphincter and glaucoma should be carefully excluded. The pupil is contracted in the presence of paralysis of the sympathetic. Inflammation of the iris and an accidental myotic should be excluded.

Later signs of intraocular involvement are myosis and the Argyll-Robertson pupil. Myosis is due to the disturbance of the ciliospinal centers or disease of the superior cervical sympathetic ganglion. Spinal myotic pupil may react to light and accommodation. The myotonic pupillary reaction occurs in spinal myosis; it is a rigidity of the sphincter of the iris after light is thrown upon it and is probably due to disease of the iris tissue. Instead of myosis, mydriasis is a rather rare symptom of tabes. The Argyll-Robertson pupil is rather constant, occurring in about eighty per cent of the cases. The lesion in the Argyll-Robertson pupil is probably in the afferent tract shortly after the fibers leave the sphincter nucleus. The exact location is in doubt. Sluggish reaction to light is quite as suggestive of the Argyll-Robertson pupil as complete loss of

light. Great care should be observed in the determining of the pupillary reflexes so as to avoid a sensory and psychic stimuli.

The reversed Argyll-Robertson pupil is a rare phenomenon and difficult to explain. The loss of accommodation and convergence reflex occurs late in the disease, and usually is associated with complete internal ophthalmoplegia. The paradoxical pupillary reaction to light or convergence dilatation for the near point is rare.

The irregularity and inequality of the pupil are early phenomena and of diagnostic value. Myosis and the Argyll-Robertson pupil are late. In themselves these reflexes are not pathognomonic of tabes, as they occur in paresis and syphilis of the nervous system, and in other conditions. When associated, however, with other symptoms they are of great differential value.

WALTER W. WATSON,
Secretary.

WILLS HOSPITAL OPHTHALMIC SOCIETY.

Meeting of March 2, 1915. Dr. P. N. K. Schwenk, chairman.

Dislocation of Lens.

Dr. Zentmayer exhibited a case of dislocation of the lens into the anterior chamber successfully treated after the method of Ewing. The patient was a man about thirty years of age. The lens had been dislocated for years. Symptoms of acute secondary glaucoma set in two days before the operation. The pain was so severe that it caused the patient to swoon and to vomit repeatedly. The lens, which was translucent, was entirely within the anterior chamber, except for a short arc of its equator which was behind the upper narrow iris circle. Under ether a broad keratome was entered. At the sclerocorneal margin at the lower outer quadrant the blade was pushed between the posterior surface of the nucleus and the posterior capsule of the lens. The keratome was then slowly withdrawn while pressure was made upon the cornea. The nucleus immediately slid along the blade and out through the wound. The cortical matter was then washed out and the capsule dragged out. No vitreous was lost. The patient made an immediate recovery.

Traumatic Cataract.

Dr. Zentmayer also exhibited a case of traumatic cataract in a man about thirty years of age, in which he had extracted the lens after the method of simple extraction of the senile lens. An excellent visual and cosmetic result had been secured.

Etiology of Cataract.

Dr. S. D. Risley, in a symposium on cataract, said that the operation for the extraction of the opaque lens must be regarded as a capital operation in ophthalmic surgery. While the signal importance of a correct technic could not be overestimated, the choice of procedure and the technic must, in the final analysis, hinge largely upon the variety of the cataract and the operator's concept of the etiology of opacity

of the lens. The day was long past when the ophthalmic surgeon regarded the opaque lens as a necessary concomitant of old age. While it was true that the majority of cataracts occurred in people after middle life, it should be remembered that it was, nevertheless, an exceptional occurrence; that the vast majority of even the very aged were spared this misfortune; that, therefore, some reason must be sought for its presence in these exceptional cases. The etiologic factors were on the one hand purely local and were to be found in the irritative and pathologic changes set up in the uveal tract, resulting from a lifelong strain upon the eyes in the struggle to overcome the errors or refraction and abnormalities of binocular balance, and was usually accompanied by the phenomena of asthenopia.

On the other hand, it should be borne in mind that the opacity of the lens, barring the soft cataracts of early life, occurred at an age when the organism was beginning to manifest the wear and tear of life in general impairment of function; when the physician and surgeon anticipated the presence of cardiovascular disease, faulty digestion, constipation, toxemias, infections, disease of the joints, affections of the liver and kidneys, high blood pressure, and impaired glandular function. Reasoning *a priori*, there was probably no organ of the body more prone to participation in these general disorders than the pigmented, highly vascular uveal tract of the eye, and the correctness of this reasoning found ample corroboration in the daily clinical experience of the ophthalmic surgeon. Since the nutrition of the eye is so largely dependent upon the vascular choroidal tract, it was to be anticipated that the avascular structures in the eye, especially the lens and vitreous body, would be the first to suffer injury from any impairment of the nutrition of the globe due to uveal disease. In one hundred and eighty-six cases of incipient and immature cataract studied with this in mind, seventy-two per cent showed evidence of vitreous degeneration by the presence of infiltrates and webs floating in a more or less fluid vitreous and accompanied by ophthalmic evidence of uveal disease, and in a large percentage a history of more or less prolonged asthenopia. The opacity of the lens was, therefore, to be regarded as a sequel of uveal disorder and in its general management treated as such.

Complications During and After Cataract Extraction.

Dr. Zentmayer dealt with them in the order in which they might occur in the operation. He said that some of the complications were due either to the carelessness of the operator or to individual conditions, local and general, and were often forecasted by these peculiarities. He considered too small a corneal section as one of the most serious of all complications. Loss of vitreous, while always to be avoided, was not serious if moderate in amount. He believed that efforts to improve matters by operative interference often led to a further loss, and he thought that it was frequently wise, after sweeping a spatula up under the lid, and after the speculum had been removed, to bandage the eye without attempting a toilet of the wound. Delayed closure of the wound need give little concern, being best met by removing all dressings and applying narrow strips of isinglass plaster across the lids to hold them quiet. A protective mask should also be worn. If this fails to bring about closure, a careful search of the wound must be made for capsular and cortical shreds. A filtration of the aqueous will give rise to the appearance of leaking wound.

Discussion.—Dr. Chance said that so clear an exposition of such chapters on “cataract” as had been presented deserved the thanks of all present; and he, for one, wished to express his gratitude to his seniors for what they had said. The subject of cataract, he continued, is so vast that it is impossible to end any discussion, once it is started; neither is it possible to generalize on any division of the subject. Cataract is so intimate and personal, no two patients presenting exactly the same conditions, that no two surgeons could proceed and manage their patients in the same manner; and one may succeed where the other fails, although each has expended his best skill.

Dr. Chance wished to call special attention to the direction given by Dr. Fisher, that when pressure has once been begun for the expulsion of the lens, it must be maintained evenly, persistently, and without the slightest relaxation, until the entire lens has been extruded. The speaker recalled the manner in which Maitland Ramsay conducted this point in his technic. In several extractions which Dr. Chance had seen that accomplished surgeon perform while visiting in Glasgow a few years back, Ramsay had used a glass rod with a hook-

shaped end, curved somewhat, to conform exactly to the curve of the lens. When adjusted, it applied itself so evenly that by a sort of "tour de maitre" movement the lens could be brought out entirely.

What Dr. Fisher had said in regard to the effect of allowing a thin sheet of posterior cortex to remain, Dr. Chance could very well second from his own experience during the past winter, and from the observation of several cases in the Wills Hospital.

Dr. Zentmayer's reference to the use of unusual instruments designed to prevent serious consequences arising from complications, recalled to the speaker's mind the procedures of some of the distinguished surgeons no longer living. They had always gone prepared to meet any emergency, and the house surgeons were instructed to place a specified number of instruments on the tray. All of the teachers of most of the men now connected with the hospital had used relatively few instruments, seeming to be able to adapt one instrument to various purposes. Certain of them, especially Dr. Norris and Dr. Harlan, were timid in the use of the wire speculum. They preferred to expose the globe by simply holding the lid apart or, at most, to use a Desmarre lid elevator, up to the point of expressing the lens. From that time on, the lids were held apart by the assistant's fingers. Dr. Chance then recalled how these and others of the surgeons would express the lens by simply pressing on the globe through the lids, for both direct and counter pressure. They so applied the lower lid as to bring out the loose cortical matter at the same time that the dense nucleus was expelled.

In reply to Dr. Risley's question as to which method gave the best results, the pure corneal incision, or that with a conjunctival flap, Dr. Chance said, judging by his observation of the results obtained by the former surgeons, he thought that here again the personal element entered too largely for him to specify the one or the other as being the best method. One surgeon could obtain uniformly brilliant results by means of incisions placed exactly within the corneal limit, while others invariably obtained good results with a corneal flap, although the after-astigmatism was usually of a high degree. Dr. Chance considered the point to be aimed at to be the obtaining of a smooth surface, in a good plane, absolutely free from débris.

Meeting of April 12, 1915. Dr. McCluney Radcliffe, chairman.

The Preliminary Preparation for Cataract Extraction.

Dr. Paul J. Pontius read a paper on "The Preliminary Preparation for Cataract Extraction." He considered the subject under five separate headings, as follows:

1. The patient's general condition.
2. The eye itself.
3. Preparation of the patient and the eye.
4. Preparation of the instruments.
5. Preparation of the operator and his assistants.

1. The Patient's General Condition.—After the surgeon's decision to operate, the patient often needs a more detailed examination. Therefore, we should first satisfy ourselves that the general physical condition is one favorable to operation. General catarrhal conditions of the nose, throat and ears are well known disposing factors to infection, and require active treatment. Acute or chronic ulcers on the body and limbs are also dangerous. A few months ago, about three days after a cataract extraction on a Polish woman, in the writer's service, a very active ocular infection developed. It was discovered, through an interpreter, that the patient had a small chronic leg ulcer, which she had scratched with her finger, and had then slipped the same finger under the eye bandage and touched the lid, which, she said, felt "itchy." Hence, the infection. Bronchial inflammation, either acute or chronic, as well as asthmatic attacks, should receive appropriate treatment before any operative procedure, as their presence may result in serious complications. Cardiac lesions are also of vital importance, and may prevent the patient from resting in a recumbent position. About a year ago such a case was admitted to the Wills Hospital. When the patient was put to bed and prepared for operation, it was found that he could rest only on the right side; and it became necessary to operate on him in this position. Gastrointestinal conditions should be carefully studied, since in this class of cases inflammations, ulcerations, or malignant conditions may exist, which would possibly cause much annoyance both during and after the operation. Autointoxication and chronic diarrhea may play an important rôle during the convalescence of the

patient following operation. Diabetes is not always a cause sufficient to make one decline operative interference. Post-operative recovery, when this disease is present, is usually uninterrupted. Nevertheless, the ophthalmologist should endeavor to reduce the percentage of sugar, which may be temporarily increased by the mental strain incident to the operation. Careful study of the urine should be made for albumin, casts, sugar, indican, etc. Bladder complications, especially prostatic enlargement, may prove very serious. The writer has a very distinct recollection of such a case during his internship in the hospital, for there were many night calls for catheterization. Lues must not be overlooked, because the condition may be more active than the ophthalmologist suspects. While not considered of much importance, tuberculosis may be often overlooked, unless a careful physical examination is made. Anemia often interferes with rapid recovery, so that it is important to make a careful study of the blood and blood pressure. A high blood pressure accompanied with arteriosclerosis, is a signal to watch for intraocular hemorrhage.

2. The Eye Itself.—A careful examination of the lids may reveal blepharitis marginalis, ulceration, or even the beginning of malignant disease. Catarrhal discharges from the conjunctival or the lacrimal duct and dry and encrusted lids need careful study and treatment. Should the conjunctiva show any inflammatory condition, smears should be made from the secretions found in the cul-de-sac and puncta, and appropriate treatment should be instituted. Indeed, it is wise at all times to make such bacteriologic study, irrespective of the pathologic condition of the conjunctiva.

It is important to study carefully the tension of the eyeball with the tonometer, to determine the intraocular pressure. If it is high, or if the operator is in doubt, the patient should receive appropriate treatment until the operator feels it is safe to go on with the operation. Many years ago there was a patient in the Wills Hospital in whom, after making a corneal incision for a cataract extraction, it was necessary to bandage the eye and administer ether before finishing the operation, because the patient was suffering so much pain. When he had recovered from the ether, he admitted having been struck in the eye with a hair brush four weeks previously,

and said that since that time he had been seeing colors around lights. A cataract rapidly matured; and though the eye showed no external irritation, the patient confessed that it was tender to the touch. He stated that he had been advised to say nothing about the accident because no surgeon would operate upon a tender eye. This case affords an illustration of an undetected glaucoma associated with cataract.

3. Preparation of the Patient and the Eye.—A purge is ordered after the patient's admission. It is usually calomel, followed by a saline, and is given the day before the operation. The eyes are bathed twice daily with sterile boric solution until the day of operation. The preparatory toilet consists of a tub bath and a shampoo. Two hours previous to the time of the operation the face is washed with liquid soap and sterile water, followed by alcohol, particular attention being given to the region of the lids and brows. The conjunctival sacs are washed with bichlorid solution, 1/10,000, followed by boric solution. Moist pads are applied over the eyes, both of which remain bandaged until the giving of the anesthetic is begun. In some cases the cilia are trimmed, according to the preference of the operator. After the operation the patient is returned to bed, where he remains during convalescence.

Patients to be operated upon during the afternoon require no dinner. When the operator is ready the patient's bed is wheeled into the operating room, and the administration of the anesthetic is begun. The anesthetic is local in all but exceptional cases. Freshly made four per cent solution of cocain hydrochlorid and adrenalin solution, 1/1,000, is the anesthetic most frequently employed; although some prefer holocain and adrenalin. The location of the bed and the proper position of the patient having been determined, the bandage is removed and the giving of the anesthetic is begun. To secure anesthesia, a drop of cocain with a drop of adrenalin is instilled into each eye, after which, at intervals of two minutes, three more instillations of cocain alone are made in the eye to be operated upon. The patient is directed to close the eyes between the instillations. The anesthetic is presumed to be suitable for the section two minutes after the last instillation, or ten minutes after the first instillation.

The conjunctival sac now receives its final cleansing, being

irrigated with boric acid solution, after which the face and head are covered with a large sterile sheet, with an opening only sufficiently large to expose the field of operation. The conjunctival sac is cleansed by wiping with cotton applications of boric solution, and then flushed with boric wash.

4. Preparation of the Instruments.—All the instruments are scrubbed and, with the exception of cutting instruments, placed in the sterilizer. After proper sterilization they are removed, wiped with alcohol, and placed on a sterile tray and covered with sterile towels. Cutting instruments are not boiled, but are placed on a sterile tray and covered with absolute grain alcohol for fifteen minutes before the operation. They are then dried with sterile cotton and placed on the sterile tray with the other instruments.

All solutions are sterilized before operation and placed on the tray beneath sterile towels.

5. Preparation of the Operator and His Assistants.—The surgeon and his assistants scrub their hands and arms with liquid soap and hot water, put on long operating gloves, and then wash their hands and arms in alcohol and acetone, and finally in bichlorid solution. The head and face are covered with a sterile mask, exposing the eyes, so that the mouth and nose are prevented from carrying infection while so near the field of operation.

Discussion.—Dr. Posey spoke of the necessity of examining the mouths of patients for pyorrhea alveolaris, this affection, in the experience of others, having frequently been responsible for infection after cataract operations. He further stated that he made use of White's bichlorid salve, both before and after the operation. He thought that the presence of sugar and albumin in the urine should always render the prognosis more doubtful. He had seen diabetic pneumonia cause death in one instance after a cataract operation. In his opinion, patients are frequently confined to bed too long after the operation, and advised more freedom of movement and a more liberal diet for the aged and infirm. Failure of formation in the anterior chamber, he thought to be best prevented by a conjunctival flap, and strongly advocated this form of incision in all operations. Cocain he employs as analgesic, never having seen any untoward effects from its use.

Dr. Risley said that the methods set forth by Dr. Pontius for the study and preparation of the patient for the extraction of cataract were, in nearly all respects, the same as he employed. His own method of producing local anesthesia, however, was different. The repeated instillation of cocain for ten minutes or longer, he believed not to be necessary, it having also the disadvantage of lowering the tension of the ball and apparently preventing the rapid normal secretion of aqueous. The relaxed, softened ball, he said, makes a typical section more difficult; while after its completion, the blood and other fluids are drawn into the globe, making the subsequent steps of the operation, including the delivery of the lens, more difficult, and possibly increasing the danger of infection from the conjunctival sac.

His own method is to employ a four per cent solution of cocain twice, to be followed by a solution of the adrenalin chlorid, the procedure not requiring more than five minutes at the most. Then, with the speculum in situ, he lifts the lids from the ball and flushes the conjunctival sac with boracic acid or physiologic salt solution. With this method the ball retains its normal tension or resiliency; the secretion of the aqueous from the ciliary body is undisturbed, and tends to keep the anterior chamber drained, even of blood, after the iridectomy is made, leaving a clear field for the capsulotomy.

Dr. Risley was pleased to hear the essayist urge the importance of a systematic study of general systemic states and the removal of untoward conditions, as a part of the preparation for the operation. Since the prognosis depends in large measure upon the presence or absence of pathologic conditions of the uvea, he said, this preliminary procedure cannot be too strongly emphasized.

Dr. Risley also said that he wished to emphasize Dr. Posey's view regarding the importance of getting aged persons out of bed as soon as possible after the extraction. They usually dread going to bed; and if allowed to remain there too long they grow weak and it becomes difficult to get them around again.

Returning to the subject of the preparation of the eye, he quoted the opinion of Dr. B. A. Randall, that solutions of bichlorid of mercury should not be used in conjunction with cocain anesthesia, believing that the disturbance of the corneal

epithelium is due to the influence of the bichlorid solution on the anesthetized cornea.

In regard to the matter of subsequent treatment, Dr. Risley said that his experience did not permit him to adopt the open method. While he considered rudely applied bandages and dressings to be deprecated, he felt that safety is on the side of careful protection by a properly adjusted bandage until the wound is firmly and smoothly closed. Without the support afforded by such a bandage, even when a conjunctival flap is the deliberate choice of the operator, as in his own case, there is often seen a bulging of the wound or a drawing apart of the anterior lip of the section. This is not, he said, an actual opening of the anterior chamber, but a stretching of the newly formed cicatrix, which increases the corneal astigmatism. He was quite aware that a too firm bandage over an uneven wad of cotton might theoretically cause a gaping of the wound, but thought that this is not true of the protecting bandage that he had in mind.

Dr. Zentmayer said that his preparation technic did not differ greatly from that followed by Dr. Pontius and Dr. Posey. A dressing of bichlorid of mercury ointment, 1/300, is used by him, and is applied the night before the operation. Several times on the day before the operation, and on the morning of the day of operation, which is performed in the afternoon, the nose is sprayed with a solution of permanganate of potassium, 1/3,000. The eyelashes are cut off at their curve. This Dr. Zentmayer considers a necessary precaution, as it prevents the solution from being contaminated by being dropped through the lashes as the patient winks. Again, if the lashes are left long, the cystotome may come in contact with them. After the method of Smith, the final flushing is made with the speculum inserted, but lifted away from the globe. In this way the entire conjunctival sac is reached.

If the wound is not closed by the end of the fifth day, all bandages are removed, and isinglass strips and dark glasses are substituted. This will often bring about union. In connection with Dr. Posey's statement as to the necessity of reducing the sugar in the urine of diabetics before operating, Dr. Zentmayer thought it interesting to see, in the issue of the *Journal of the American Medical Association* for April 3d, that Addis claims that this is harmful and liable to cause coma.

Meeting of May 4, 1915. Dr. P. N. K. Schwenk, chairman.

A Case of Esotropia.

Dr. Zentmayer presented a case of esotropia that had been corrected by advancing the external rectus, after the method of O'Connor. A tenotomy of the internus had been performed by another surgeon, five years before, leaving a residual squint of fifteen degrees. When exhibited by Dr. Zentmayer, two weeks after his operation, there was an exophoria of eight degrees on the perimeter.

Chart.

Burton Chance, to show the good effects of advancing the ocular muscles, exhibited a young man upon whom he had operated privately on March 17th, 1915. There had been a convergence of thirty degrees. The steps of the operation were taken as exactly as possible as those described by O'Connor. The external rectus was advanced, and an incomplete tenotomy was made of the internal rectus. There was but moderate reaction; but the conjunctival and scleral sutures were removed at the end of ten days. The area has since then become flat, though it remains vascular. The eyes are now quite parallel, and capable of free movement; while all accompanying symptoms of diplopia and asthenopia have been relieved.

Two Cases of Bilateral Violent Panophthalmitis.

Dr. Zentmayer said that, in view of the almost identical nature of the injuries received and the similar calamitous results, and because he thought it would be of considerable value to have an expression of opinion from surgeons whose experience in the treatment of panophthalmitis has been large, he had felt that the cases were of sufficient interest to report. He also stated that he was indebted to Dr. Posey for the privilege of reporting his case.

G. B. and D. H., coal miners, were admitted to the hospital on January 19, 1915, with the history that, while preparing a blast with a stick of dynamite, eleven days before, a premature explosion had occurred, striking both patients in both eyes, face and hands. They were treated in a local hospital until the time of their admission here. G. B., who was assigned to

Dr. Posey, had had the left eye enucleated on the fourth day. About this time the right eye began to swell and become painful. On the left side, the orbital tissues were greatly swollen and discolored. The conjunctiva was chemosed, and there was a profuse purulent discharge from the socket. There was a V-shaped piece torn from the inner third of the lid. On the right side, the orbital tissues were greatly swollen, the lids edematous and discolored, and the conjunctiva very edematous and protruding from between the lids. The cornea had sloughed, and there was a profuse purulent discharge exuding from the opening. Evidently an incision had been made through the globe before admission. Two days after admission this eye was enucleated and hot magnesium compresses were applied. Two days later the swelling was less, and three weeks after enucleation the patient was discharged.

D. H. was assigned to Dr. Zentmayer. In both eyes there was an intense panophthalmitis, with great involvement of the orbital tissues. The inflammation, however, was less intense on the left side. Smears showed pneumococci and streptococci. No cultures were made. Two days after admission a free incision was made through the right eyeball, giving immediate relief and establishing free drainage. One week later the globe was easily enucleated, and in the course of a few days the swelling of the lids and orbital tissues had gone. The left eye was treated with ice compresses and atropin; and later, when the swelling had subsided and the cornea was becoming staphylomatous, eserine and a roller bandage were ordered. The patient was discharged on February 2d, with the staphyloma flattened; and a small clear area of cornea gave hope that a future iridectomy might restore some vision, as there was light perception.

Discussion.—Dr. Schwenk believed in early removal of the globe. He had performed many enucleations, in all stages of panophthalmitis, without any resulting meningitis.

Dr. Griscom spoke of a case that he had seen during his term as resident surgeon of the Wills Hospital, in which meningitis and death had followed the enucleation of an eye during the acute stage of panophthalmitis.

Dr. Posey said that he had frequently removed the eye in an acute state of panophthalmitis without seeing meningeal symptoms arise. He preferred to do this in traumatic cases

in which the orbital tissues were at all injured. In panophthalmitis arising after cataract operations, he preferred to allow the inflammation to run its course before enucleating.

Dr. Risley said, regarding the advisability of the enucleation of eyeballs in the acute stage of suppurative panophthalmitis, that some years ago he had removed such an eye. The convalescence was apparently normal, and the man returned to his home. But a week later he suffered an attack of meningitis which proved fatal. This led to a study of the records of the hospital; but up to that time no record could be found of any other case of intracranial involvement, and but few cases could be found in literature. As a rule, Dr. Risley does not hesitate to remove such an eye when the safety of the other eye demands it. He said, however, that he had presented to the society, about a year before, a patient from whose eye a fragment of steel had been removed from the vitreous chamber by the magnet, through a small scleral puncture. The injury and operation were followed by a rapid and violent panophthalmitis, and a general toxemia, with high temperature, threatening a fatal termination. The ball and orbital tissues were greatly swollen and very painful. In this case he did not think enucleation a justifiable procedure; but the ball was freely incised, evacuating large quantities of pus, the infecting agent being the pneumococcus.

Dr. Zentmayer said that the consensus of opinion at the present time favors either incision of the globe or evisceration of the sclera. It is true, however, he continued, that Randolph's experiments showed that there is no danger in enucleating in panophthalmitis; but these results failed to convince even Dr. Randolph, and he advocates incision. Dr. Zentmayer could not help feeling that there is greater danger of exciting meningitis by a spread of the infection through the lacerated orbital tissues after enucleation than by allowing the pus to drain anteriorly. The degree of involvement of the orbit, and possibly, also, the organism exciting the inflammation, should be considered in deciding for or against enucleation. So far as the danger of sympathetic inflammation is concerned, Dr. Zentmayer considered it to be slight in either case, as panophthalmitis is rarely followed by sympathetic inflammation.

A Case of Injury to the Lid in Infancy.

Dr. Risley presented a patient, aged thirty-two years, illustrating the late results of an operation for the restoration of an upper eyelid after a laceration so extensive as to leave the eyeball exposed. When a small child, aged two years, the patient had entangled the curved point of a buttonhook under the upper eyelid, far back toward the retrotarsal fold, two millimeters to the temporal side of the punctum. In the frantic effort to remove it, the entire thickness of the lid was penetrated by the hook; the conjunctiva, cartilage and skin being torn through to the tarsal border, and the entire eyelid torn off to the outer canthus, where it was found hanging by a tag of skin and conjunctiva. The tarsal conjunctiva was in shreds. The tissues were carefully placed in situ and patiently stitched with fine sutures. Convalescence was uneventful. After the lapse of years there was no notable deformity. The function of the lid was perfect in all respects, and only the most careful scrutiny revealed the presence of scar tissue. Dr. Risley said that the case was an illustration of the great reparative power of the tissues of childhood, and of the fact that patient effort may at times repair an apparently hopeless injury.

Discussion.—Dr. Chance spoke of the rarity of lacerations by shoe buttonhooks, a common household implement; and, because of the result obtained, praised Dr. Risley's patience in uniting the lacerated tissues in the case shown. This case recalled one in his own experience, in which the lids of one eye of a baby had been lacerated, and the other eye destroyed, by the spurs of a game chicken. The laceration healed without deformity.

Some Remarks on Operation for Restoration of the Socket.

Dr. Posey spoke of the details of the Maxwell operation for the cure of contracted socket as just exemplified by him in an operation on a case exhibiting this condition. He had had some experience with the Weeks and Wiener operations for cicatricial contraction of the socket, but preferred the Maxwell method as being simpler and surer in its results. He thought that the formation of the floor of the socket by the flap taken from the cheek, after the method of Maxwell, was most ingenious. The flap is well nourished, and there is but little danger of sloughing. Ectropion, which is seen for a

week or more after the operation, disappears at the end of that time. Both the Weeks and the Wiener operation are more difficult to perform, and the Wolff grafts not only contract, but also frequently slough, the ultimate results being often disappointing.

Dr. Zentmayer believed it to be a mistake to make a wide flap, as this increases the ectropion; and as the upper incision of the flap is practically a straight line, the broader the flap, the more curved the lower incision, and the greater the difficulty in coaptating the edges of the denuded area on the cheek. In many cases the flap need be only wide enough to form the bottom of the cul-de-sac, as there is often some conjunctiva remaining in the orbit.

Dr. Chance spoke of the comparative simplicity of the Maxwell procedure, basing his view upon a single case of his own, and upon his observation of five or six cases of Dr. Zentmayer's. The descriptions given by Maxwell in the *Ophthalmic Review* of about 1903, as Dr. Chance recalled them, are, he said, perhaps less complicated than the details as given by Dr. Posey would seem to be. In Dr. Chance's own case, the condition, he said, is not as satisfactory as he could wish. Yet, because the lower lid had been drawn away back on the floor of the orbit, there is now a semblance of a lid, with sufficient sulcus to enable the woman to wear a small glass shell. He has not seen the operation for the defect of the upper lid, yet he has the hope of enlarging the socket by such an operation later.

The Results of Two Cases of Capsular Advancement.

Dr. Chance showed a case of the early results of a conjunctivocapsular advancement in a young man whose left eye had been divergent and depressed, by reason of congenital absence or atresia of the internal and superior recti muscles, accompanied with partial ptosis and myopia, with distortions of the optic disc.

The operation consisted in the excision of a fold of conjunctival and capsular tissues, grasped between the curved jaws of a crutch-shaped forceps. An elliptical area, exposing the sclera, resulted. The surrounding tissues were then freely dissected, and the edges united by five sutures. A partial tenotomy of the external rectus was also done. The reaction was not great. The sutures were removed at the end

of eight days. The immediate effects have been to bring the axis within the vertical. The caruncle is only slightly displaced.

This procedure was suggested by Dr. Chance for cosmetic purposes in cases of widely divergent globes, in which there is an absence of muscular tissues, prohibiting the practice of one or the other of the operations for advancement. This is the second time that Dr. Chance has performed this operation.

The first was in a woman whose internal rectus had been completely tenotomized in childhood, with consecutive divergence. The patient was shown to the society last autumn. The result continues to be most satisfactory.

In the case of the young man, a plan to advance the muscle several years ago failed by reason of there being no internal rectus present, as disclosed by ordinary dissection. Dr. Chance intends to operate later, to relieve the ptosis, and to reduce the katatropia.

Discussion.—Dr. Risley congratulated Dr. Chance on the results of the ingenious and simple procedure adopted. In one case of wide divergence following an effort, many years before, by a surgeon to correct a convergence, Dr. Risley had brought all of the deep tissues forward to the corneal limbus, in the grip of strong forceps, and inserted deeply placed sutures. The resulting cicatrix held the amblyopic eye well in parallelism with its fellow, and overcame the deformity of a wide divergence. This method had the disadvantage of a vertical ridge of tissue tangent to the corneal limbus, which required many weeks to disappear. In the method pursued by Dr. Chance this was avoided.

J. MILTON GRISCOM,
Secretary.



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